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# This Week in The IRON AGE

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September 21, 1944

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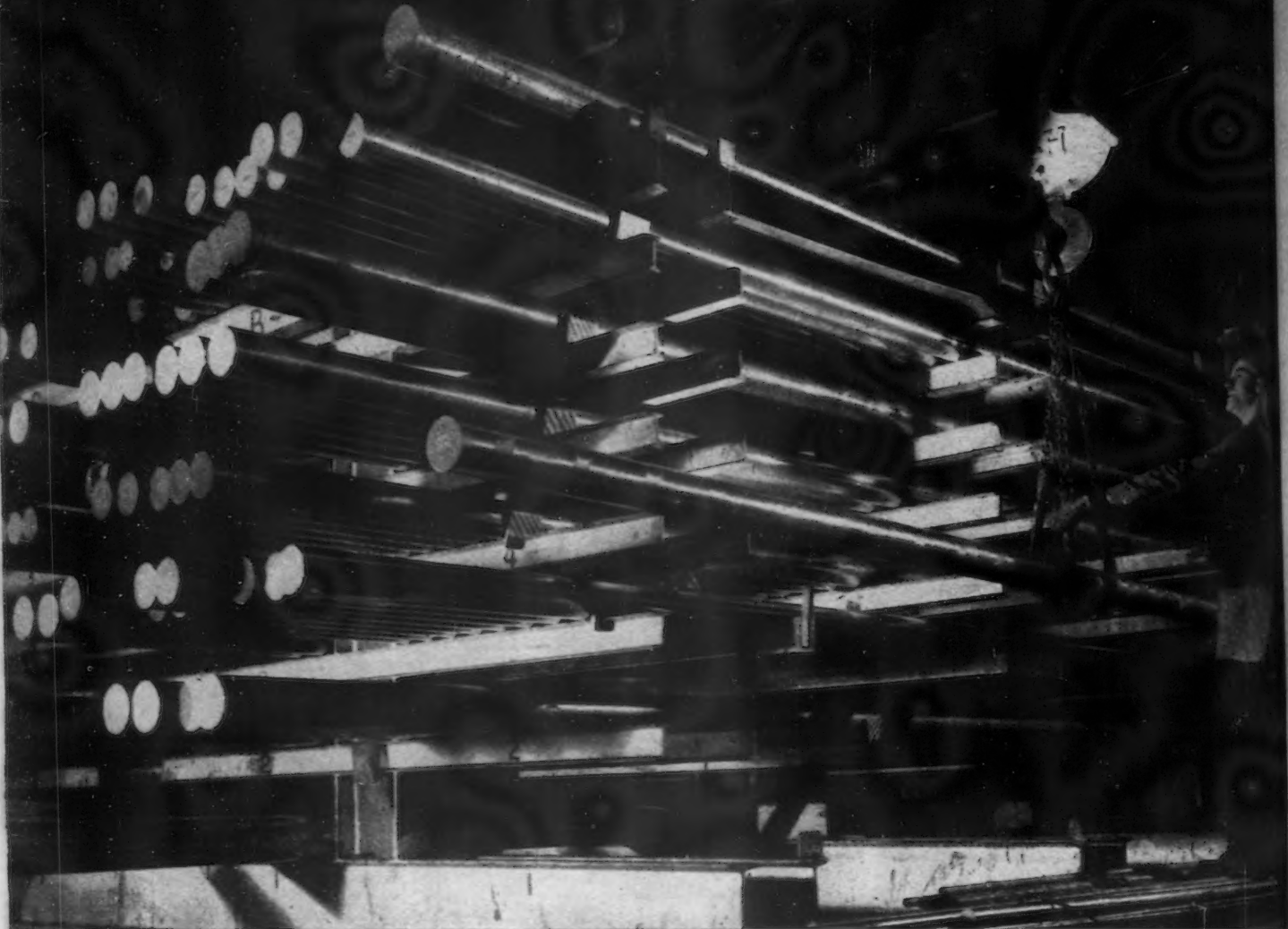
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## Business Moving Back Home

ON the day that this was written, I returned to New York from Detroit and learned that on the following day I would have to take another unanticipated trip out of town. An early train was indicated which meant that there would not be sufficient time to go home to the country. So the secretarial staff was put to work to find a hotel room.

Altogether, at least 30 New York hotels were contacted with monotonous repetition of the phrase: "All sold out". Hotels in Newark, Trenton and Philadelphia had the same reply. Apparently the invasion of the East is now in full swing.

I inquired of a hotel manager, who, although a good friend, could do nothing except telephone other hotels which were in the same predicament, just what was the reason for this influx of epidemic proportions. There were one or two conventions in town but these would not jam all of the thousand room hostelries of the big city. No outstanding prize fights were scheduled, nor were there any other headline events like a World's Series. With clubs also filled to capacity I was forced to make shift and sleep in my office. My friend, the hotel man, said that it was inexplicable to him. The previous week a room could easily be obtained at any of a dozen first rate New York hotels.

I cannot imagine conditions abroad being much worse than this. At any rate this will be good training for by the time that you read this editorial (if you do) I shall either be at the bottom of the Atlantic or somewhere in the United Kingdom on a tour of investigation of British war industries at their peak. It should be a most interesting visit, especially since it is by invitation of the British Ministry of Information, and I hope to be able to describe to you, via cable, some of the highlights of what our British industrial cousins have done to keep the mills and factories going while within 30 minutes' flying range of the enemy.

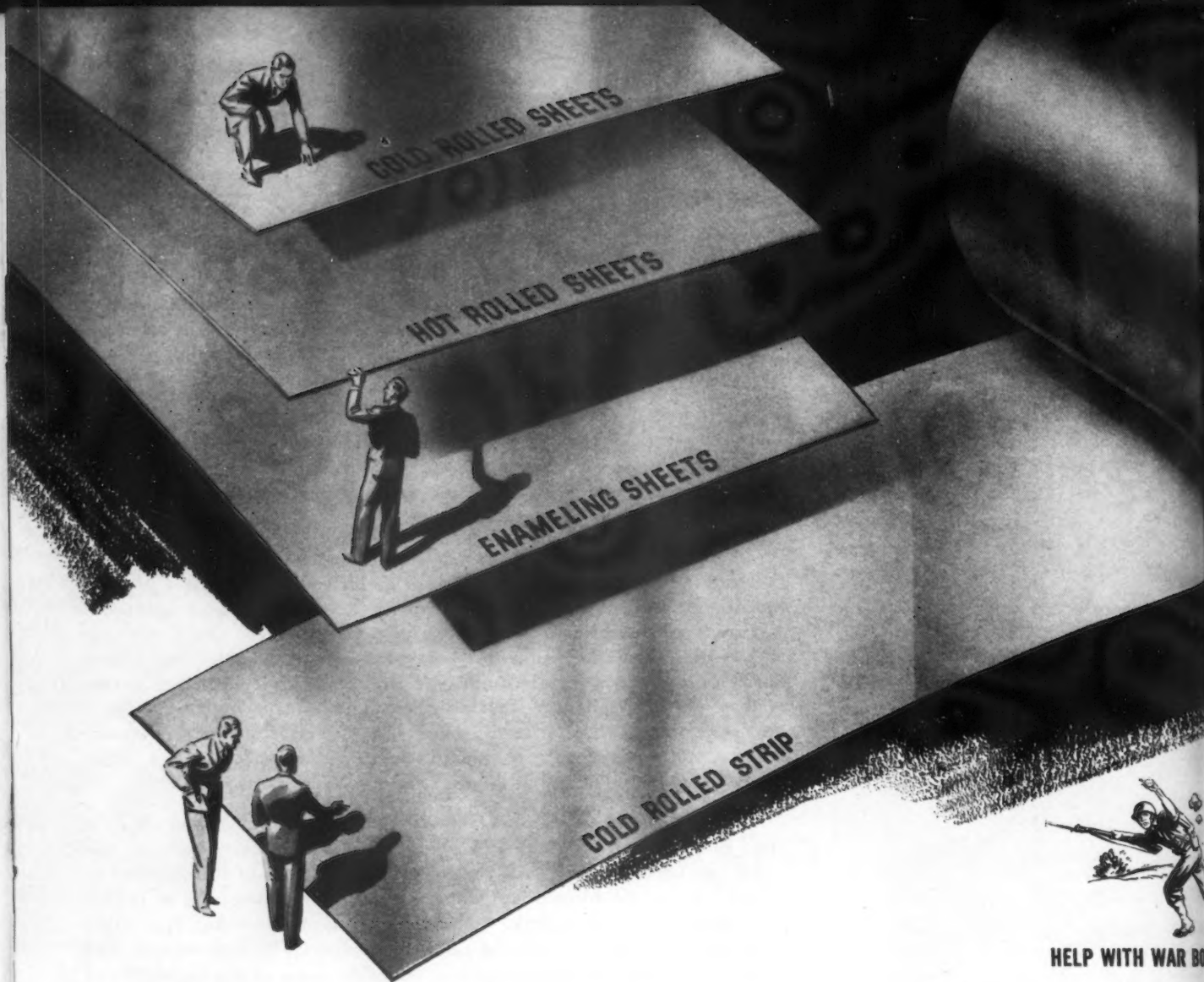
But to come back to the hotel situation in New York. This influx of visitors must mean something. Certainly most of them are not here just on pleasure bent, for the vacation season is over, and traveling today is indeed not altogether pleasurable.

I am inclined to think, and I hope it is true, that most of them are here, believing that the end of the war in Europe is just around the corner—a nearer corner let us think than the one that prosperity hid behind some years ago—and that they have come here to make concrete plans for postwar business and employment.

Do not misunderstand me to mean that the postwar business headquarters is going to be in the East. I found during the past few days that Chicago, Detroit and other cities are experiencing a similar influx. And the West Coast probably is having the same experience.

However, things apparently are letting up in Washington. I was able to get hotel reservations there last week first shot out of the box. It's a hopeful sign to me that activities are moving back where they belong.

*J. H. Van Deventer*



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► During the first seven months, \$4,743,000 worth of war contracts have been terminated by the War Department while settlements with contractors for the same period covered contracts with a total face value of \$4,362,000,000.

On July 31, 4600 of the 27,344 terminated contracts remained unsettled with more than 3500 held up because contractors had not filed their claims.

Contract terminations are now running well ahead of new business placed by the Pittsburgh Ordnance District. Dollar value of awards has dropped from \$41,000,000 in March to \$7,000,000 in August, with July at \$6,000,000 the low point.

► Since 1939 the larger steel companies have taken over about 87 per cent of the barrel and drum business, representing 435,500 tons of sheet steel consumption. Only about 64,500 tons of the business is still in relatively independent hands.

► What is wanted in a postwar civilian airplane has just been the subject of a survey by Aircooled Motors Corp. Surprisingly, 55 per cent of the returns came from those not connected with the aviation industry, and only 3 per cent of the returns came from women.

The postwar civilian pilot wants a land plane (not an amphibian) and prefers a low-wing monoplane, a cruising speed of 125 to 150 miles per hr., and a range of 500 miles. Metal wing covering and fuselage are the popular choice.

► A bid has been put in for the Los Angeles-Honolulu postwar air line by the Ryan School of Aeronautics which will be merged with the Pacific Air lines. The trip will cost only \$128.25.

► Current reluctance of eastern paper processors to pay ceiling prices for scrap paper is an indication that the intensity of scrap paper drives will soon slacken east of Chicago. Pressure for fats and greases also will soon ease.

► Kaiser's Fontana blast furnace is being bedevilled by the high sulphur of Vulcan ore. The furnace now requires a 22 per cent lime burden, and emergency shipments of limestone of 6000 tons monthly have been negotiated with the U. S. Steel Corp. in Utah.

Negotiations between Kaiser and Riverside Iron & Steel Co., which controls the lower-sulphur Eagle Mountain Iron Chief ore, are still desultory and mutually suspicious.

Kaiser chief executives are now in Washington for postwar plant operation conferences with Jesse Jones.

► The B-29 Superfortress has not yet been used over Germany. However, from leaflets recently dropped by Allied flyers over Europe, the employment of Superfortresses there may be expected soon.

► The German air force is not quite the "goner" that post-invasion newspaper reports seem to indicate. The Luftwaffe still has a formidable fighter force in the West of Europe composed of not less than 1750 excellent fighter craft and well-trained crews imbued with the fighting spirit.

The Luftwaffe Command has decided that the day has not yet arrived for the last-ditch fight for the Fatherland.

► To record "kills" more vividly, color films are now being used in the motion picture cameras of American fighter aircraft.

► Lt. Count Einsiedel, formerly of the Udet Fighter Group (Udet was killed testing a jet fighter), and now a prisoner of war in Russia, has spoken about Germany's jet fighter over the Russian "Free German" radio with the openness so characteristic of German prisoners in Russia.

The Count stated that the German jet fighter is superior to ordinary airplanes in speed and rate of climb, and is so light that it can sail like a glider with the jet propulsion switched off. The fighter is armed with a single large-caliber rocket gun.

The Count pointed out that production of jet fighters is far behind schedule. By the autumn of 1942 the Richthofen Jagdegeschwader expected to have squadrons of jet fighters in action, whereas it was a year later before the first models saw action.



# Packaging For

## Postwar Export . . .

**T**HE overseas shipping experiences of manufacturers and the Army Ordnance Department during this war have brought a very likely end to some of the former packaging practices of exporters. Gone are the balmy days when special handling of export shipments substituted for proper packaging and probably gone also are the days when marine insurance payments made up for the inadequacies of packages.

In general, postwar packages must be relatively inexpensive and yet completely capable of protecting the con-

**. . . Packaging for export will be sharply influenced by overseas shipping experience gained during this war. Packages will be similar but less expensive and somewhat less complex. Conclusions are arrived at about the methods of packaging which will be required for metal products, the place of packaging in establishing postwar markets, and descriptions are given of the materials and methods which will be retained in the postwar era.**

o o o

tents under semi-severe shipping and storage conditions. Where to draw the line in this regard has been learned in great part from the Ordnance Department's experiences under extreme conditions.

Second only to the economic limits of packaging will be the influence likely to be exerted upon postwar package design by the regulations of marine insurance companies. It is likely that marine insurance com-

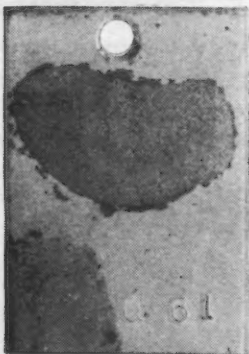
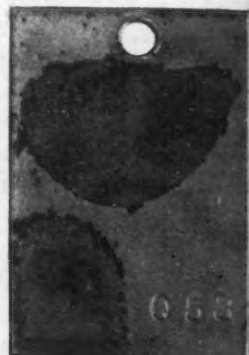
Stoddard Solvent

Trichloroethylene



← No  
Cleaning  
→

← No  
Cleaning  
→



← Cleaned  
80-lb.  
pressure  
Spray,  
1/2 min.  
→

← Cleaned  
30-lb.  
pressure  
Spray  
→



← Cleaned  
1.5 min.  
immersion  
→

← Cleaned  
Three-phase  
Vapor  
degreaser  
→



panies will set up strict packaging specifications controlling the degree of corrosion protection, protection against physical damage, loss of identification and other factors entering into insurance claims of shippers. The marine packaging standards are likely to be similar to those required by inland commercial shippers except more stringent due to the differences in handling.

A third factor influencing postwar package design will be the value placed on substantial export volume. The economic advantages will be felt in greater sales potential and in greater competitiveness against other less far-sighted exporters. Lend-lease packaging has taught many foreign importers the value of proper packaging. The export firm which delivers the goods intact will certainly have the edge on any other exporter using poorer methods.

The most prominent trend is that

the future commercial packages will conform somewhat to wartime Ordnance Department specifications. There, however, will be modified: First, to accommodate the much less severe

By DONALD C. MAC DONALD

shipping and storage practices of peacetime commerce and second, to bring costs of packaging within commercially feasible levels. Postwar packages, while expected to be less complicated and expensive than military overseas packages, will be improved over prewar designs by better packaging materials, improved cleaning methods and the packaging mechanization learned during this war.

The probability of less expensive

packages, even though a high quality is maintained, springs from the success of the production packaging methods developed during the war by many contractors. Mechanization has so lowered packaging costs and man hours that a substantial part of wartime packaging procedure could be maintained after the war without increasing packaging costs appreciably above prewar levels. It is not unlikely that even for much domestic consumption some modification of present overseas packs may be adopted to offset bin and shelf spoilage. If so, the combined volume of domestic and foreign packaging might make vastly improved packaging methods economical for all output.

The postwar period is certain to see greater precaution taken to deliver the goods in perfect condition, protect them against damage during storage or display prior to sale, to indelibly identify parts or whole as-

ichloroethylene

Methanol

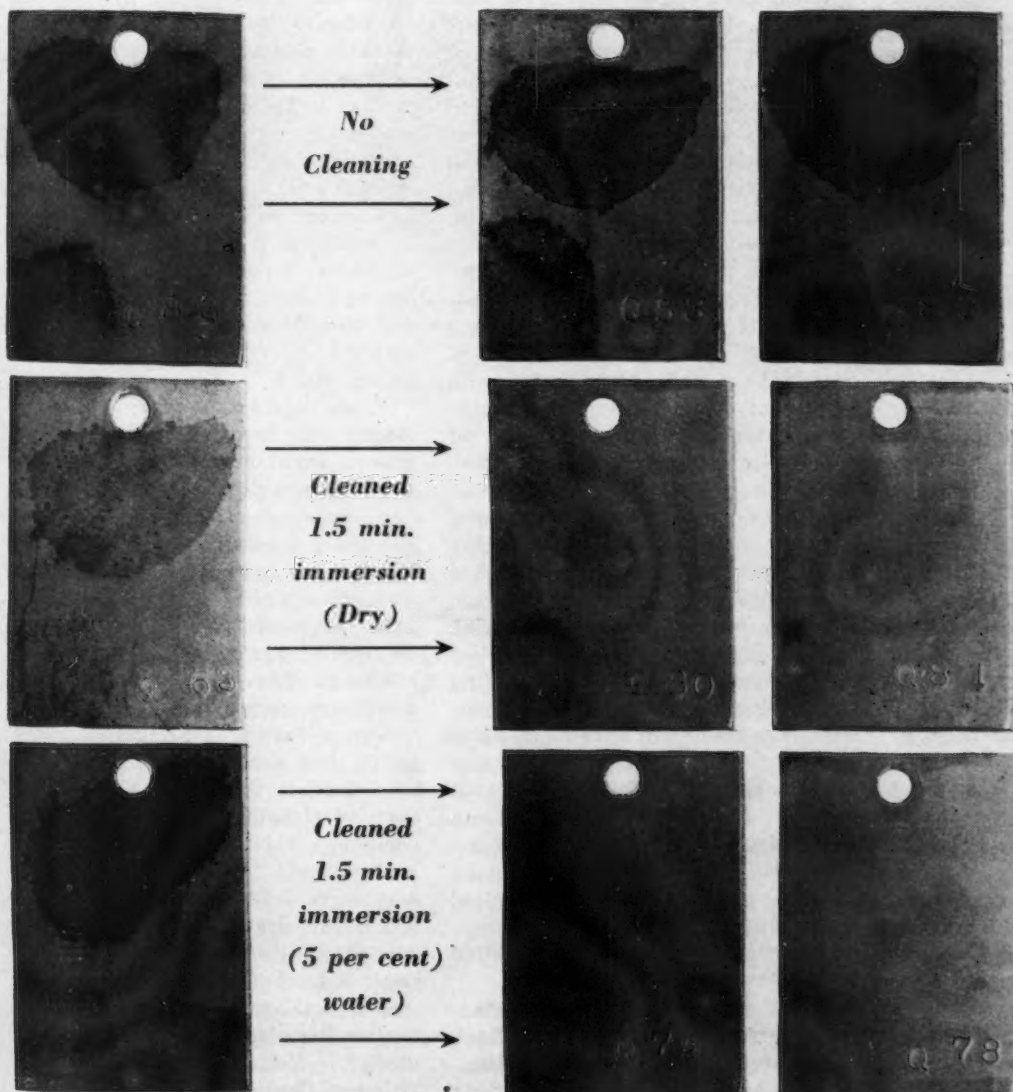


FIG. 1 — Results of experiments conducted by the Frigidaire Division of General Motors Corp. to determine the value of various cleaning techniques in the removal of fingerprints from metal surfaces.



semblies and to provide greater visibility of the product under all conditions.

Individual cartonizing of parts may lose ground after the war, due to inroads of such materials as ethylcellulose stripping compounds which will eliminate the necessity for individual cartons in many cases pertaining to steel or metal parts, small tools and gadgets.

Bagging in cellophane and other transparent types of material should grow in favor except where parts to be bagged have irregular surfaces which could cut through and break the package and the corrosion seal it otherwise offers. Other plastics of many kinds will find places in the packaging field but primarily will be expected to offer strength, transparency, and corrosion protection of a high order to be acceptable for the protection of highly finished or complex steel parts or mechanisms.

Plywood has already played a great part in the packaging program and is expected to continue in its position. Its great resistance to heavy shock due to its cross grain and low moisture content, resulting from its method of manufacture, recommends it highly. Toxic treatment of the wood and adhesive before assembly into plywood and after being cut to size has removed plywood's main disadvantage, namely that its resinous adhesive bond attracted insects in tropical climates.

Hermetically sealed metal cans appear to hold an extremely promising future in postwar. Vacuum packed cans are expected to be widely used as a package for delicate electrical and optical equipment and similar items difficult to protect by other methods.

One of the most enlightening facts learned from wartime experience with packaging has been that it is not a process which begins after the product has been finished. Packaging, according to the new view of the subject, starts early in the process—right on the production line.

The early stages of packaging on the production line translate to product cleanliness. This is the first essential of adequate rust prevention and corrosion control of metallic products. The human fingerprint, for instance, under rust preventives, has probably caused more corrosion damage in this war than any other single cause.

Probably the outstanding lesson that has been learned by wartime packers of finished steel products or assemblies for overseas shipment has been the value of chemically clean surfaces. This lesson has taken on

such magnitude that it is now translated to mean that cleanliness must not only be observed but must begin with the first finishing operation and follow every step of the way down the production line. Hence, packaging for the modern producer is becoming a continuous process paralleling production and ending only after all operations are complete.

### Fingerprint Corrosion

The common fingerprint has been the worst corrosion provocator, but any contaminant under a corrosion preventive at any step in the manufacture can be the seat of violent corrosion under certain conditions. Simple cleaning methods have been developed to accomplish this cleanliness at low cost.

Again it should be reiterated that cleaning for true corrosion prevention should follow every handling of a metal product where fingermarking can occur and a temporary rust preventive should protect all surfaces during processing to avoid atmospheric corrosion.

It has been learned that most marketed cleaning materials or processes will clean as specified but many of them do not remove fingerprints at the same time. This error in calculation has cost many parts both in process and after shipment. Special fingerprint removers used after cleaning will complete the job, however, and assure an uncontaminated surface ready for rust-proofing. Some temporary rust preventives are combination agents which remove fingerprints as well as acting as rust inhibitors. Standard Oil Co.'s Rust Ban 392 with 5 per cent water is a typical example of this type although a number of others are offered on the market. Almost any good emulsion cleaner will also do the fingerprint removing job but the possibility of trapping water from the emulsion in blind holes in complex shapes is always a hazard in using this type of material. Blowing dry with moisture controlled compressed air or whirling, tumbling or spinning the part dry will generally overcome this disadvantage. False bottoms and conical bottoms must also be watched carefully as potential moisture traps. The water contents of cleaning solvents such as methanol must also be thoroughly eliminated from the part by drying or spinning. Water displacing protective coatings also act to displace water in blind holes.

Few if any cleaners will satisfactorily perform both operations. Such claims are made for certain combination fingerprint removers and tem-

porary rust preventives. However, the contamination of these compounds with dirt from the cleaning action rapidly lowers their rust preventive efficiency and has caused recommendation of a prior cleaning operation.

Perhaps the simplest and most economical method from the standpoint of equipment requirements is the following: Subject the part to submersion, and scrubbing if insoluble contaminants are present on the surface, in a recommended solvent such as Stoddard solvent. Follow this by immersion in any good fingerprint remover, a satisfactory example of which is methanol with 5 per cent water. This method is particularly recommended where special cleaning equipment has not already been installed as the process can be carried on in a simple arrangement of two side-by-side tanks or two safety containers on a work bench if parts are small, thus making possible a cleaning department at the side of every machine or the end of every production line. Following cleaning and fingerprint removal, immediate treatment with a temporary rust preventive should be used to provide protection for the now thoroughly cleaned surface. A caution to be noted here is that if an aqueous fingerprint remover is used, dry compressed air or the use of a water displacing preservative is necessary.

A second method, where equipment is available, is the use of a soluble oil washer followed by compressed air drying. Here, for utmost safety, the use of a combination fingerprint remover and temporary preservative is recommended.

Vapor degreasers of any number of stages will accomplish the cleaning process satisfactorily but will not remove fingerprints. Here again, the cleaning process should be followed by the use of a good fingerprint remover, blowing the part dry and applying a protective coating of temporary nature. An alternative method permits the use of a vapor degreaser plus a combined fingerprint remover and temporary corrosion preventive.

Not so favored for highly finished parts, but acceptable under proper conditions, is the use of alkaline immersion cleaning or alkaline electrocleaning. This process removes all contaminants from the surfaces but may leave a deposit of alkaline salts which can draw water through the rust preventive applied over them and cause corrosion.

A typical example of complete production line cleaning engineered to its utmost is found in the Frigidaire Division of General Motors Corp., Day-



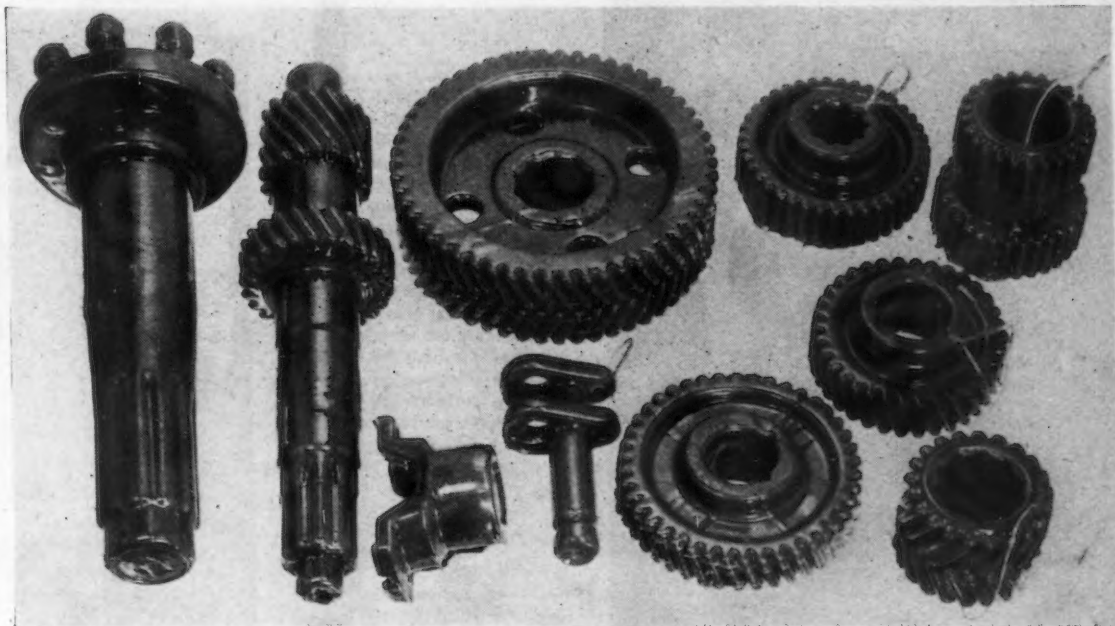
ton, where the simplest of the foregoing methods handles most of the cleaning at every stage of operation. Fortunately, since the manufacture of refrigeration machinery requires utmost cleanliness, this plant had Stoddard solvent piped all over the plant during prewar production. At the end of every production line and beside nearly every machine can be seen the red color of the cleaning tanks. Dual tanks, one containing Stoddard solvent and the other methanol, serve to

printed part can stand for about a week without rusting and inspection without the disadvantage of a protective film can be accommodated. The routine in these rooms is to clean the parts thoroughly in a solvent bath and dry, give final inspection, clean again in a solvent, apply a fingerprint remover and a water displacing temporary corrosion preventive prior to assembly. Assembly is done with the protection of gloves.

If excessive importance appears to

type of final corrosion preventive required.

By far the simplest type of package and the cheapest is the Army Ordnance Method I pack which is designed to permit ready access of water in fluid or vapor form to the preserved product, relying upon the corrosion preventive entirely for protection. This method is adaptable to basic parts such as bars, heavy forgings, castings and other semi-rough parts which it is practical to coat with



**FIG. 2**—Ethyl cellulose strip coatings present possibly greatest possibilities as a postwar protector of finished steel parts. Above use is in connection with the Ordnance Department's Method I-A pack. Translucency, which may later be developed into transparency, may offer good visibility of the part plus present protection. The coating cleanly strips from the part like a banana peel after being slit with a sharp instrument. Ordnance Department photo.

clean and remove fingerprints after every handling. A temporary rust preventive in a nearby receptacle serves to protect the part en route to the next operation. Suitable fire precautions and fume exhausts have solved the fire and toxicity hazards normally presented by these fluids.

Many final inspections of highly finished, high accuracy parts require inspection without any trace of a film of coating of any type on the surfaces. To clean a part so thoroughly naturally subjects the part to almost immediate attack by corrosion. To solve this condition, Frigidaire, which is now engaged in making high precision ordnance and aircraft parts, has developed air conditioned inspection rooms where temperature is always about 80 deg. F. and relative humidity about 35 per cent. In this controlled atmosphere even a finger-

be attached to the dangers of fingerprints, it should be remembered that fingerprints even though applied over some rust preventives can cause rust. An example of this would be where a cleaned and temporarily rust protected part was subjected to further handling and later was again put through a cleaning bath but not a fingerprint remover. The solvent would remove all of the protective coating but not the fingerprint. Consequently, any protective coating applied later would merely cover the fingerprint, permitting it to act as a source of water absorption to create rust.

#### Selection of the Package

The selection of the type of packaging required by specific types of products should be discussed first, as this regulates to a great extent the

a substantial abrasion and deformation resistant coating. This form of packaging is seldom adaptable to finer parts and is further limited in use to those instances where some adequate means of removing this heavy coating is available at the destination. Wrapping over this coating generally consists of a layer of approved greaseproof paper, plus packing in a waterproof paper lined box for the physical protection required.

The selection of a coating in this instance requires a combination of good physical properties to withstand both abrasion and deformation plus water-resisting qualities. It must have a hard wax-like consistency when set, to eliminate squeezing-out under the weight of the product in shipment. It must also have a high melting point and heavy viscosity, the former to obviate melting at tempera-

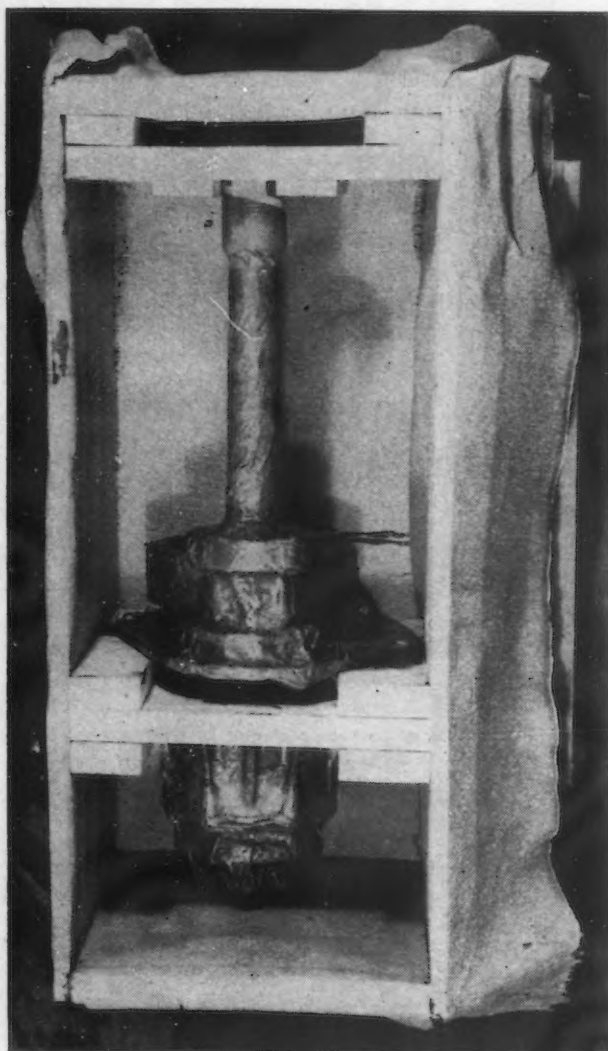
tures encountered in ships' holds and the latter to assure heavy coatings upon dipping. This method, while not adaptable to many of the finer finished steel products, has many advantages in the shipment of rough or semi-finished products.

The Method I pack is the cheapest type of protective packaging where adverse shipping conditions exist. Its greatest disadvantage is that the coating requires cleaning facilities at

recommended. This type of pack is especially adaptable to parts or assemblies which can be dip-coated or otherwise completely fluid water-proofed. This package excludes exterior conditions but does not exclude the moisture from the air within the package itself. Hence, the rust preventive on the surface of the part itself must be protection against moisture vapor regardless of relative humidity of the inner air.

the light grease or oil for resistance to the air and moisture within the sealed package. The units of product may then be individually cartoned or packed in numbers in a larger box without individual cartons.

An adaptation of the method, depending upon the size and shape of the product, permits the use of bagging or placing in envelopes which are not necessarily conforming to the shape of the item. Few of the grease-



#### LEFT

**FIG. 3—**A typical example of the Ordnance Department's Method I-A pack with a conforming wrap of greaseproof material. The part itself is coated with a rust preventive, wrapped, dipped in special wax and supported in a waterproof paper lined box. Post-war customers on other shores are learning to appreciate this type of packaging. Ordnance Department photo.

o o o

#### RIGHT

**FIG. 4—**A typical example of bad packaging procedure which may be a reminder to some of prewar packaging practice. Foreign importers have learned that this damage is not necessary and will look to better arrival conditions as a key to "where to buy." U. S. Army Signal Corps. photo.



the destination thereby somewhat limiting its application. In postwar shipping, most destinations will have some method of cleaning available. This is contrary to the case during this war, thus making the method widely adaptable providing it suits the product. Two recommended Army Ordnance specification coatings meeting all requirements for the Method I pack are USA 282-C and AXS 673.

For finer finished products which require greater physical protection as well as protection against the attacks of corrosion, the Method I-A package of the Army Ordnance Department is

The most common I-A method consists of dipping parts such as gears, small tools, cutters, reamers, etc., into a bath of light oil preservative such as USA 2-120, AXS 674, or the light grease preservative USA 2-84 b. The choice between types generally is made with consideration for the removal facilities at the receiving end. Over this surface protection a conforming wrapping of grease and water-proof material is placed and the whole dipped in special wax to form the water-tight seal. This excludes outside climatic conditions but relies upon the surface protection of

proof and water-resistant wrapping materials offer translucency now but this advantage is being widely sought. Certain grades of cellophane are permitted at present for Method I-A packs, however, which do provide visibility of the contents. Synthetics such as Pliofilm and Saran, both highly transparent, are at present reserved for Method II packs, since they provide a barrier against moisture vapor also, but it is expected that some modification of them or their improved supply after the war will recommend them to many who wish to enclose products in transparent or translucent bags or wraps.

A third method of protection for the Method I-A pack which will be discussed at greater length later is the use of ethyl cellulose strip coat compounds. Products which will permit dipping into this material obtain a thick, rubbery coating which at once



seals away outside moisture and provides considerable physical protection. It is translucent and peels from the product easily after being slit with a sharp tool or knife. This coating can be used with or without an undercoat of preservative and eliminates the wrapping and wax sealing operations necessary with grease and water-resistant wrappers.

With the Method I-A package the outer protection may consist of an individual carton, bag or overwrap for each product or set of products, and packed in a water-proof paper lined wooden box built to ordnance specifications. For greater detail ordnance specifications of cartoning and boxing should be consulted. In general, it should be remembered that the outer containers are to be water-resistant but not waterproof, as the individual product in this pack is singly protected against moisture.

The two greatest advantages of this type of package consist of easy accessibility to the product without extensive cleaning equipment at the destination and ample protection against all weather and shipping hazards except water vapor sealed within the package. The Method I-A pack has been very successful in tropical climates and under many other adverse wartime shipping conditions and will surely find a modification in peacetime shipping. Better and cheaper wrapping and preserving materials still in the development stages may bring costs on this package far below present ones.

The most precise package of this war is the Method II pack of the Army Ordnance specifications which has been successfully utilized for the safe shipment of precision instruments including electrical equipment, fire control instruments, optical equipment and other materials which will not withstand moisture under any conditions. This is a refinement of the Method I-A pack which, in addition to excluding the effects of outside atmosphere, also removes the moisture from the air within the package by means of a desiccant.

It is especially suited to equipment which cannot be dip-coated or coated in any way. In this package the method is to apply a protective coating wherever possible and rely upon the desiccant to remove the inner moisture to a degree of about 30 per cent R.H., thus causing a relatively inactive inner atmosphere. The outer wrappings of the pack must in this case constitute a moisture-vapor barrier which will not only exclude water but also its vapor. Saran tubing, a transparent non-soluble plastic re-

sembling cellophane, has been found to have one of the lowest moisture-vapor transmission rates of any material known. Pliofilm, a rubber base transparent material is also widely used by the Air Corps as a moisture-vapor barrier. Many of these materials can be heat sealed to form an air and vapor-tight barrier while others are sealed about the part with waterproof adhesives and by other means. The most commonly used desiccant in these packages is silica gel.

The Method II package is not a war baby, contrary to much opinion. It was originated by the Export Division of General Motors Corp. and

FIG. 5—Typical of packaging advancement during this war is this Method II pack containing an electric generator. The transparent bag forms a moisture vapor barrier and bags of silica gel absorb sealed-in moisture. Packages like this deliver the most fragile and sensitive equipment under toughest wartime shipping conditions. Photo, courtesy Forest Products Laboratory.



was in use for the export shipment of Chevrolet motors as early as 1937. Nor was the experimentation with moisture vapor barriers in packaging a war product. Davison Chemical Corp. of Baltimore was experimenting several years before the war with this type of wrapping material. Still better materials of this type perhaps developing out of wartime experience are anticipated for postwar use.

Boxing for wartime shipping has become a complex science built upon pure experience. Wood is specified in all cases now for the outer container except where steel or asphalt laminated fiber is permissible. The paper box for export has been discarded due to its poor resistance to water and humidity. A number of proved designs and material, construction, and bracing specifications have been developed. Rather than attempt to outline the scope of these the reader is advised to consult the U. S. Army

specification 100-14A (U. S. Navy specification 39 P 16a.) This covers the subject adequately and it might be mentioned that nearly 100 per cent of all shipments going out in boxes built strictly to these specifications have been received in good condition on all war fronts. This alone recommends the thoroughness and adequacy of these specifications both now and in the postwar era.

A point not to be overlooked in packaging is that of identification. Regardless of the condition of a part when received, if the identity is lost it is of no value to the recipient. Consequently, it behooves the packer to

make certain that identification is as thoroughly done as the protective packaging itself. The Army has requested that all advertising material be eliminated from boxes to permit complete shipping address and repeated identification. This hazard remains even in peacetime shipping.

An important trend, especially in metal products, is the utilization of electrically etched numbers which indelibly mark the part. In this case the transparent type of protective coating is helpful in that vision through the coating to the part number is possible. The use of water and grease resistant materials and inks for identification of parts appears to provide the necessary essentials for "protected" identification. This factor in shipping offers as great hazards and advantages after the war as during it and should be a part of postwar packaging considerations.

The most pronounced trend in cor-



rosion protective materials which will enter into postwar packaging is the movement toward tough transparent materials that offer combined visibility, moisture-vapor protection, abrasion and deformation protection. Of the three, visibility appears to have somewhat the lead in importance but not necessarily because of the beauty of the product. "Eye appeal" will, however, be an important factor in the choice of such packaging material, particularly for shelf goods.

The impending demand for the combination of these three characteristics in corrosion protective materials has been an important factor in the broad acceptance of ethyl cellulose stripping compounds. Many of these already marketed offer a certain degree of transparency, an air excluding covering for highly finished surfaces, a degree of abrasion and deformation resistance not encountered in most materials of like characteristics and ease of removal. The visibility of the product through the semi-translucency of present ethyl cellulose compounds has not been acclaimed so much for its opportunity for eye appeal as for the possibility of identification of parts through the coating without removing it. Visibility for display purposes has been a secondary consideration but will play an equal or bigger part in giving the product acceptance after the war.

It might safely be predicted that if prices of ethyl cellulose compounds are suitably reduced by mass production after the war, it will become the most widely used corrosion protective material of all for packaging ferrous metal parts and perhaps also assemblies.

Ethyl cellulose is still in swaddling clothes from the development standpoint for packaging. It has many limitations, most of which may be expected to be overcome soon, but which control the breadth of its application to packaging at this time.

It does offer a fair degree of translucency under present formulations and even greater transparency is expected soon. Regardless of this development, full acceptance cannot be granted even on this score at present, because while great transparency can be achieved, no way has been found to eliminate its blushing or clouding when submerged for long periods or subjected to high humidity and certain other conditions. This, the researchers say, can be overcome but the method has not yet been satisfactorily established. So long as clouding is a factor the use of ethyl cellulose for the purpose of permitting visual identification of parts numbers,

perhaps etched on the part itself, is not feasible. Likewise, its use to provide display appeal would be similarly altered.

Clarity, however, is not the chief limitation of these stripping compounds. They cannot be stripped from any and all shapes of objects. This limits their use to comparatively simple shapes without many irregularities, undercuts or blind openings. Complex assemblies cannot be coated for the same reason. An outstanding example of a troublesome yet very practical appearing application of ethyl cellulose compounds is for protecting ball bearing assemblies. The strip coat will not strip after having entrenched itself in and around the bearings. Several attacks on this problem are being followed and early results are expected.

The results of using ethyl cellulose stripping compounds, however, have been very successful where successful at all. Reports from various users indicate that from 60 to 90 per cent savings in labor are being recorded in its favor as compared with former protective measures.

Greatest effort by ethyl cellulose researchers is currently being expended upon two goals, namely, to overcome its blushing and to achieve greater elongation or stretch to facilitate stripping from more complex shapes. Its present elongation is approximately 50 per cent, a factor limiting its utility, partly caused by the limited amount of ethyl cellulose permitted in the compound. Merely increasing the proportion of the ethyl cellulose will improve elongation factor but other measures are also being considered as a means of attaining better elongation at lower cost. An elongation factor of 90 per cent is now being sought which would permit the use of the stripping compound on highly complex surfaces and assemblies.

While ethyl cellulose appears to have great postwar applicability, there is still the chance that some newer development may supersede it and offer more of the desirable properties which have been initiated by ethyl cellulose. A goal being sought is a similar coating which can be sprayed instead of dipped. If this plus the other advantages of ethyl cellulose can be developed in a single compound, another new winner has been found. Contrary to this possibility, many chemical firms have banked heavily upon the success of ethyl cellulose compounds and there are now more formulators of compound than there are users. The combined efforts of these investors may

keep ethyl cellulose in the lead.

One certain field for the stripping compounds which would not be particularly affected by any other similar development is that of protecting cutting tools. Makers of drills, reamers, milling cutters, small gears, files and many other metal tools and parts with either fine cutting or cut edges are just beginning to realize the import of this type of coating. There seems little question that most progressive makers of such parts will turn 100 per cent to a strip coat of some type in the near future.

A singular advantage which will recommend strip coats of various kinds for postwar export is their easy removability. The export customer who has the contrast of getting messily packed parts which have to be especially cleaned after receipt from one supplier while another sends parts which can be stored on shelf or in bin just as received and made ready for use with no more than a jack-knife as equipment will certainly register a vote in favor of the latter.

### Wood Boxing Methods

Some of the most conclusive packaging lessons of the war were learned by the Ordnance Department in dealing with wooden boxes and dunnage for hundreds of kinds of shipments. These lessons, while again needing modification, according to the geography of export markets and the shipping conditions to be encountered later, should be applied rather literally to postwar boxing for export.

On packaging machine tools and other types of machine assemblies, ventilation is a requisite, particularly in tropical climates. When ventilating, however, screen should be applied over ventilation holes to hinder entrance of insects, etc. The ventilation has proved helpful in reducing condensation within the boxes, a problem of great importance in the high humidity areas.

In all types of heavy crates and boxes, butt-joined lumber is recommended for strength and economy, a lesson which would easily be carried over into postwar boxing.

The old question of whether to metal strap crates or not has been somewhat answered by evidence that it is beneficial in strengthening boxes and crates during war shipping. Both flat band and wire strapping have given good results.

Interior bracing, according to ordnance specifications, has proved well worth continuing and the practice of end-grain nailing has been condemned as damaging to ultimate strength of joints.

# Designing

## Rubber Press Tools

**A**TTEMPTS to produce a concave flange on a plain form block usually results in a break. This is due to two factors: One, the rubber flowing across the edge of the form block stretches the flange sideways and two, the rubber bending the edge of the flange first rather than starting the bend near the radius of the form block, see Fig. 20 (a). Another failure in forming concave flanges on plain form blocks is that the flange is left irregular due to the flattening of the bulge, see Fig. 20 (b).

Successful concave flanging can be done on this stock by employing a dam. The retainer block concentrates the pressure on the radius and starts the bend at this point so that splitting will not occur on the edge. The stretching tendency is also reduced because a smaller amount of rubber is displaced into the dam, see Fig. 21. Straight and concave flanges require different designs of dams. For concave flanges, pressure is necessary at the bottom of the flange to stretch the metal. A wide shallow dam will increase this pressure but still prevent pulling and reduce overbending at the edge. Good results were obtained by using a rectangular dam  $\frac{5}{8}$  in. deep and  $1\frac{1}{4}$  in. wide. The initial failure to take place in producing the concave flange is a bulge over the radius of the form block. This condition may be eliminated by using harder rubber or by using a solid punch. A sharp concave

*... In the second and concluding part of the article, applications of rubber press tools for forming concave, convex and reverse flanges, joggles and some new difficult shapes are described. Certain drawing operations on sheet aluminum hitherto considered beyond the capacity of the hydropress are also described. The data are from Eastern Aircraft Division, General Motors Corp., Linden, New Jersey.*

flange may be produced by a rotating punch, see Fig. 22.

### Controlling Wrinkles

When a convex flange is formed on a form block, no matter how large the radius may be, wrinkles will form because there is not sufficient pressure from the rubber to shrink the metal.

In order to remove these wrinkles, hand work is necessary to shrink the metal enough to form a smooth flange. This is done by placing the formed part on a hammer block similar in shape to that on which the part was pressed and shrinking the metal by hand hammering. This method of hand forming is not advisable because extreme accuracy as well as duplication of parts cannot be obtained and should be used only when slight deformation takes place. In cases where the number of pieces required are large, it is better to use a machine known as a shrink press, which combines both a shrinking and hammering action so that the metal is drawn away from the wrinkles and at the same time is hammered. Even this method will not

obtain accurate parts and should be used only when there is a slight wrinkle on a part.

A better method to obtain controlled accurate flanges on rib sections is to design indentations in the form block into which the excess metal is forced as the flange is made, see Fig. 23. This is known as the *controlled wrinkle* method and it is necessary that the indentations in the form block shall be carefully designed so that they will not only come in the right place, but that they will provide the necessary space for the excess metal without introducing a stretching action that will cause a distortion at some other point in the flange.

Another method of producing a convex flange is by stretching metal over the radius of the form block. Excess metal at the bottom edge of the flange rests on a dam. As the forming proceeds the rubber grips the metal and drags the flange down. Fig. 24 shows the action that takes place in this method. Only thin soft stock can be formed this way. Usually the flange

RUBBER FORMS  
BULGE IN PROCESS  
OF FORMING



(a)

FLANGE IS LEFT  
IRREGULAR DUE TO  
FLATTENING OF BULGE



(b)

FIG. 20—Two causes of failure in forming concave flanges on plain form blocks.

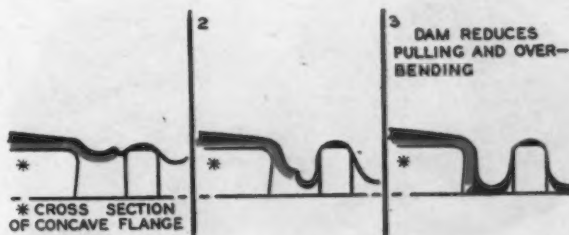


FIG. 21—The dam is utilized to avoid splitting in concave flanging.



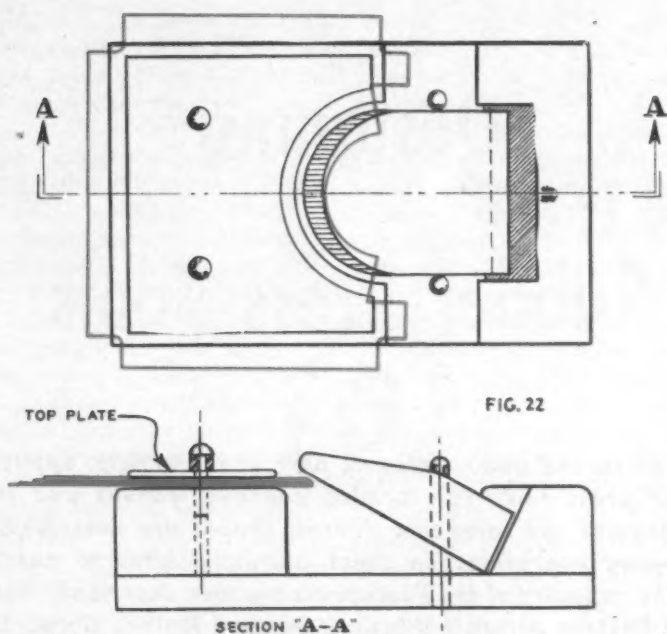


FIG. 22—Eliminating the bulge over the radius of the form block by the use of a punch.

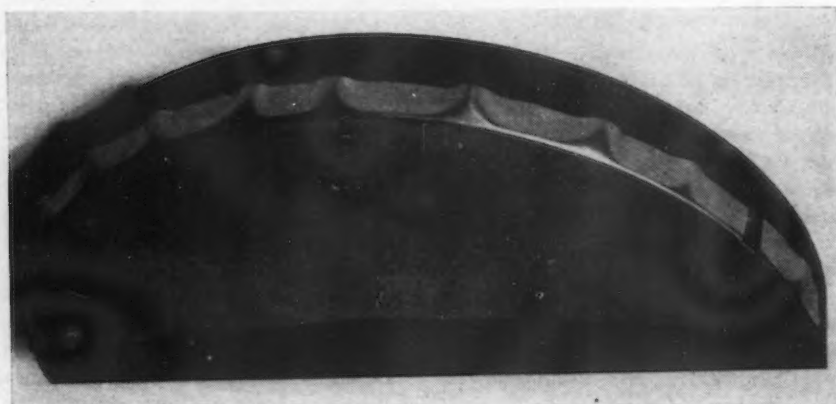
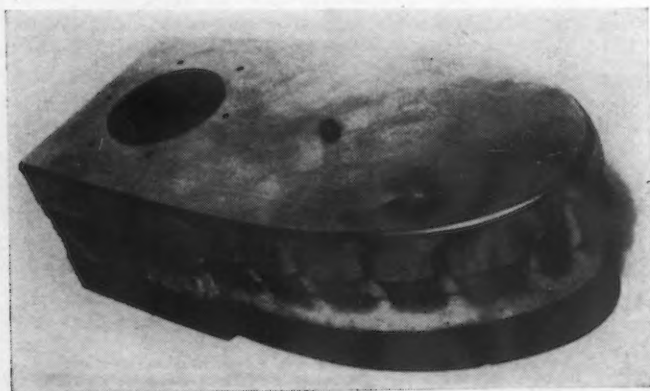


FIG. 23—(Top) Excess metal causes irregular wrinkles in the case of a plain block. (Bottom) By using a block with shrink wrinkles, the outside surface will be smooth and the wrinkles regular.



does not come out flat and a trimming operation is required to trim the bottom of the flange.

On the leading edge of ribs, when the radius is sharp, wrinkles are formed almost always in the wrong direction. Rubber does not draw in the flange at exactly the center of the indentations in the form block, thus requiring hand work to reform the part.

### Using Pre-form Blocks

An extra operation may be added which will eliminate practically all hand work on the leading edge of ribs. The pre-form block will perform shrink wrinkles inward at the exact center of the indentation. (See Fig. 25.) The creases should be located to fall in the center of the creases on the final form block. The creases should not come up to the bend line.

The undercut form block explained previously is used to get more accurate shrink wrinkles on the flange. The higher pressure concentration at the bottom of the flange draws the metal tight against the form block. Shrink wrinkles that require still more pressure concentration when the thicker metal is being formed should have a form block with an undercut and a dam, see Fig. 26. A three stage form block having a pre-forming form block together with the part made from these tools, are shown in Fig. 27.

### Tackling the Reverse Flange

Many sheet metal parts have flanges bent in opposite directions. For convenience, they will be divided into three classes: Reverse, opposed and offset.

Reverse flanges may be produced by the two methods shown in Fig. 28. The undercut block at A is simplest and will do most jobs. A minimum

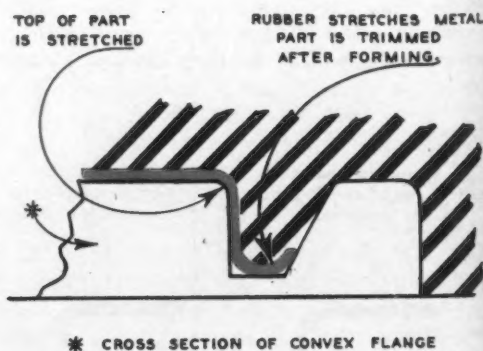


FIG. 24—Another method for producing convex flange on thin stock is to have the rubber stretch the metal.



clearance of 1 in. between the second radius and the platen of the press must be observed. This design acts like the conventional dam except it is standing on edge, the press platen acting as the retainer block. Increasing the overhang will bend a tighter radius because a higher pressure concentration is produced at the edge. The reverse flange may be 1 in. wide or more if necessary. This type of form block should be kept apart from other form blocks in the press. The reverse flange may not form completely if there is anything to put a strain on the rubber near the undercut.

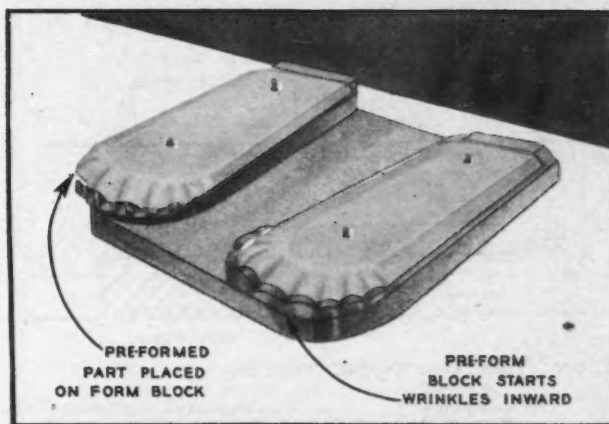
Two form blocks are necessary for a narrow reverse flange or when the first flange is of a width that an undercut block will fail due to pressure drop on the vertical side or too great overall height.

### Opposed Flanges

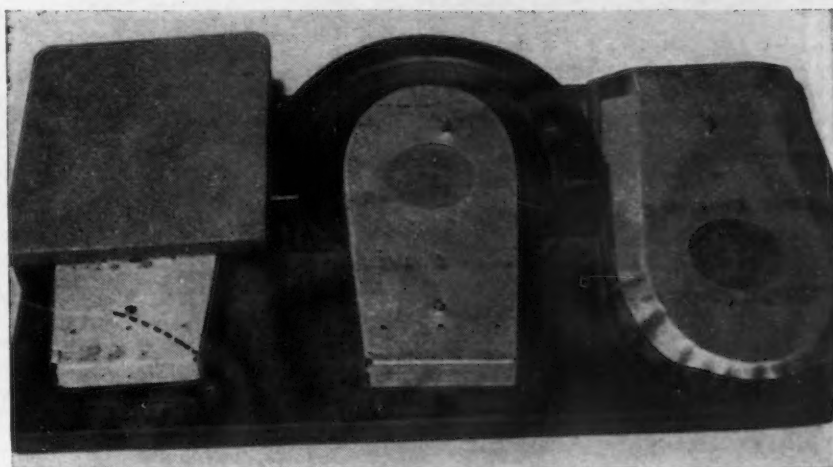
Parts having opposed flanges may be produced by the three methods shown in Fig. 29. The part may be formed on two form blocks, as shown at A. After flanges are formed in one direction, the part is inverted and these flanges are protected by supporting blocks while the part is completed. A dam may be used to produce narrow flanges on either operation or a reverse flange may be produced on the second operation. The method shown at B produces a part in one operation and should be employed where possible for that reason. It is difficult to produce corners where a wide flange is bent in each direction because the punch must be leveled to allow rubber to bend the downward flange. The punch cannot be leveled and also support the upward flange.

Rubber is used to bend the upward

RIGHT  
FIG. 25—Pre-form blocks used to start inward wrinkles.



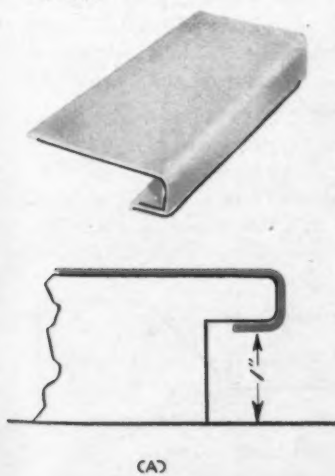
RIGHT  
FIG. 26—Undercut and dam combination for higher pressures.



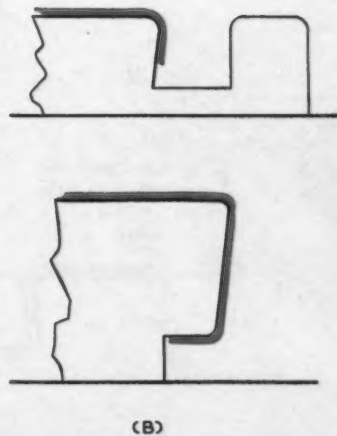
ABOVE  
FIG. 27—Part made from three-stage form block having a pre-forming block.

LEFT  
FIG. 28—Two methods for producing the reverse flange.

SHORT REVERSE FLANGE



LONG REVERSE FLANGE



flange, in Fig 29 C. This design is adapted from the double pad rubber presses being used in England.\* A 55

\*Machinery (England), 59:29-32, Oct. 9, 1942.

durometer rubber plug is forced up into the die by a pad of soft gum rubber on which the assembly rests. The taper in the lower die holds the edge

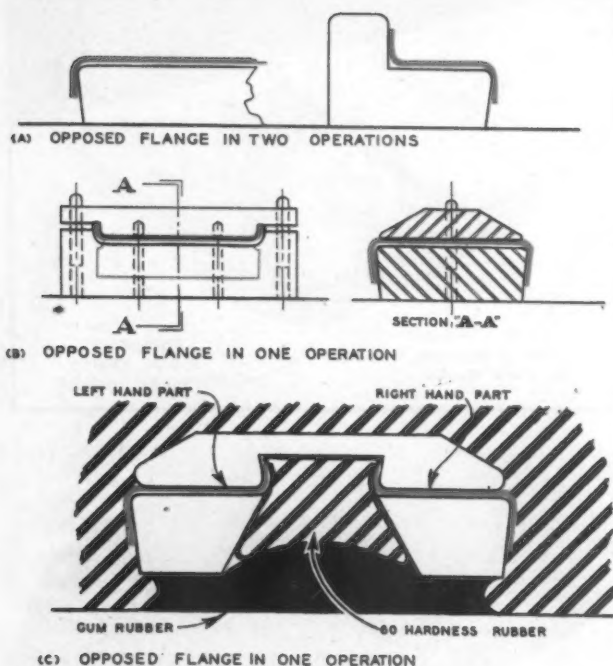


FIG. 29—Three methods for producing the opposed type flange.

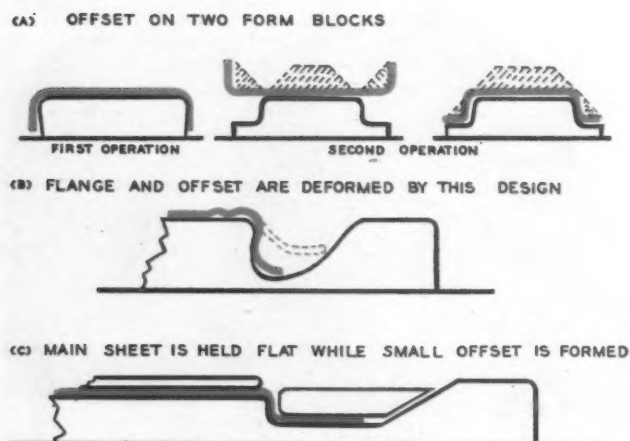


FIG. 30—Producing the offset type flange.

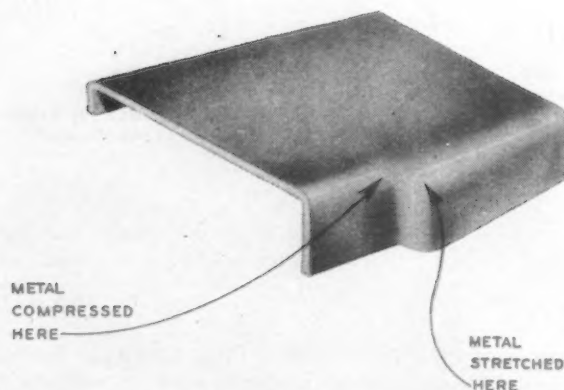


FIG. 31—The joggle requires simultaneous compression and stretching of the metal.

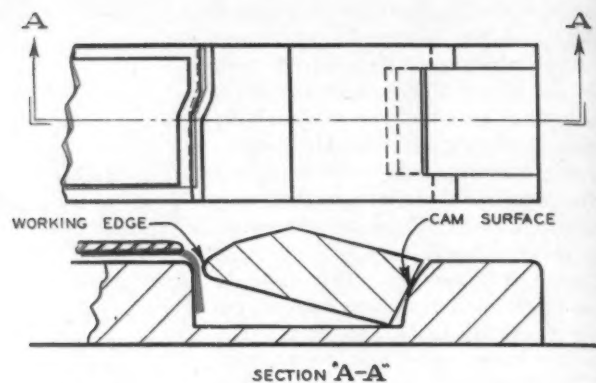


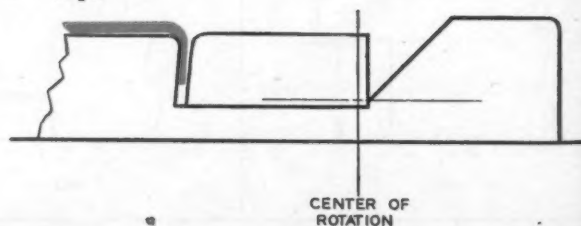
FIG. 32—Rotating punch for producing the joggle.

of the plug by friction so the plug will return to the lower die as the press is opened and thus eliminate handling. In this design also, it is difficult to produce parts having opposite flanges that are close together. The rubber plug is well adapted for a part having flanges turned up from a hole. Also, left and right hand parts having one upward flange may be placed so that one piece of rubber will form both parts as shown in (C).

#### Offset Flanges

Offset flanges are difficult to produce in rubber presses without distortion in the flat surfaces. Fig. 30 shows several methods which may be applied under different conditions. Two operations, as shown at A will produce the best results. One form block is used to make the radius for the flange and once it is formed correctly, the most difficult part of the job is done. The part is then inverted and placed on the second form block. A part can be produced by using only the form block but less distortion occurs if blocks are placed as shown by the dotted lines. When the outer flange is bent more than 90 deg., blocks are necessary to support the flange so that it will not collapse under the rubber. A long curve is developed in the top if the center plate is not used.

FIG. 33—Punch for producing joggle on an irregular edge.





Many variations of the design shown at *B* have been tested but it has been found that the flange and offset are distorted before the radii are completed and the flange dragging across the retainer block may break the metal. A high concentration of force is required for an inside radius and rubber will not develop this force even under ideal conditions, much less in a corner where pressure is always low. The design shown at *C* distorts the flange and offset but is the only method that will produce a large flange on a small offset.

### Forming Joggles

The word *joggle* is the term used for an offset section on an aircraft part. The purpose of a joggle is to permit other parts to cross or overlap and still provide level surfaces to which the metal covering sheet may be attached, or to permit one end of the channel section to enter another similar section of the same size when the two are joined. Fig 31 shows a form piece with joggle.

Pieces with joggles may be formed from thin soft stock on the hydraulic press without difficulty, but the forming process generally will produce a wrinkle at the point where the joggling occurs as well as a bulge on the inside of the offset. Provision must be made to absorb this extra metal, and this can only be accomplished by higher concentration of pressure.

Parts of thicker metal containing a joggle cannot be formed completely by the action of the rubber. These are usually finished by hand. Any of three methods which use a punch operated by the rubber may be used. A wiping action produces the best job since it pulls the metal over the form block and prevents a bulge above the joggle. Fig 32 shows a so-called rotating punch guided by a cam surface so that the radius acting on the metal travels in a vertical line to produce a wiping action. The cam must be developed for one width and will not work when the width is changed unless another cam is plotted. Where it is necessary to produce a joggle on an irregular edge, a punch rotating about the lower outside edge may be used, as shown in Fig. 33. A joggle can be produced in two operations by using the wedge shown in Fig. 34.

### Rubber Drawing Operations

The variety of drawing and forming operations that can be done on a rubber press in a practical manner is very limited, but the jobs that rubber will handle can be done very cheaply.

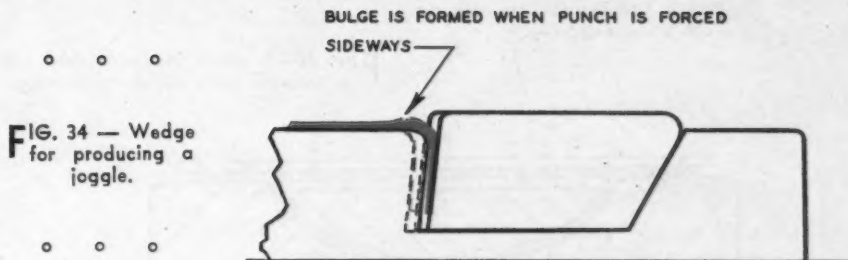


FIG. 34 — Wedge for producing a joggle.

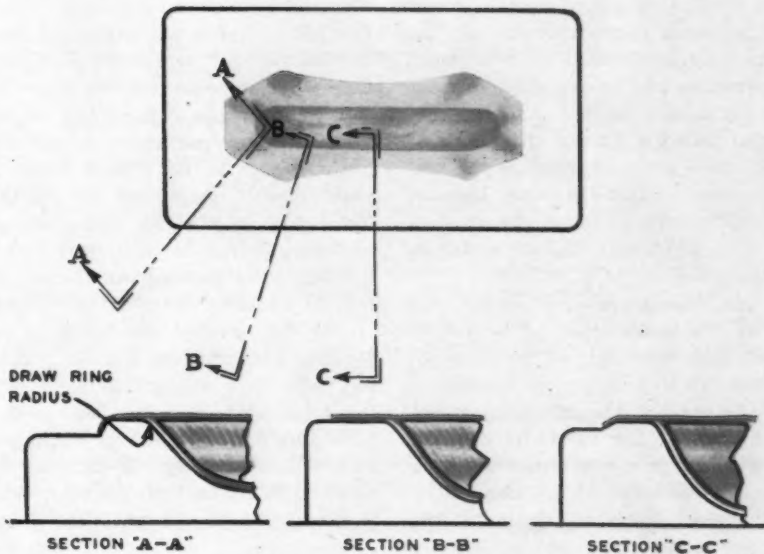
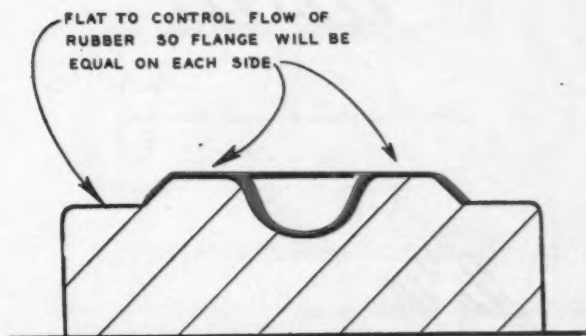


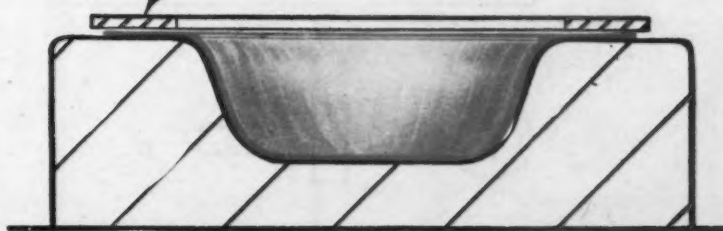
FIG 35—Success of deep forming depends on grip permitted rubber at edges.



LEFT  
FIG. 36—Die with flat surfaces for producing even flanges on deep forming.

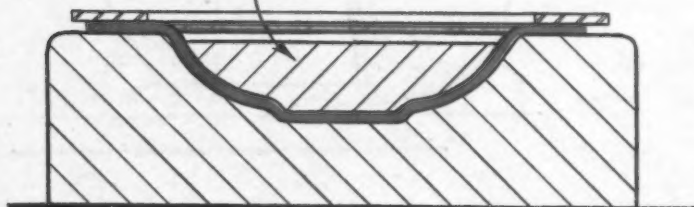
CAN BE THIN SHEET ALTHOUGH IT BECOMES HEAVY AND CLUMSY ON LARGE PARTS

BELOW  
FIG. 37—Use of the pressure plate for deep forming.



PUNCH TOO CLUMSY TO PICK UP  
FOR EACH PART

FIG. 38—A punch in conjunction with a pressure plate for deep forming.

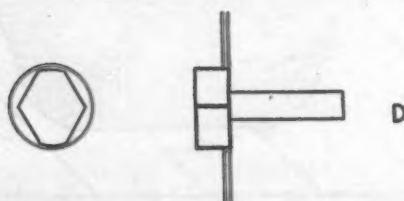
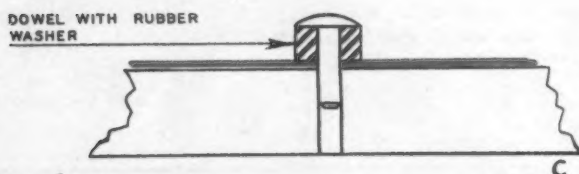
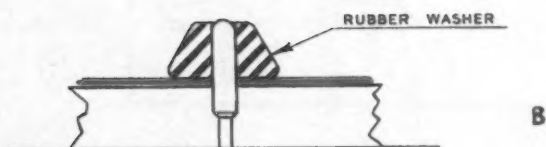
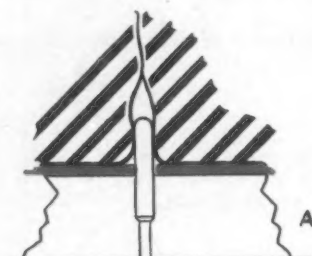


Parts containing sharp corners where local pressure concentrations are required may be formed with a punch and pressure pad in the rubber press. Deep forms are started with the rubber and finished by inserting a solid punch. Dies using a pressure pad and punch are limited in size because these parts must be handled each time a part is produced. Spherical forms are the ideal part.

In order to draw sheet metal, the edge of the blank must be held with proper tightness so as to prevent wrinkles while a force is applied to form the metal. The gripping power of the face of the open die may be controlled by selecting materials with varying coefficients of friction or by the shape of the die. Masonite and

aluminum have a low coefficient of friction and thus will allow the greatest amount of slipping. A Kirksite face when dry has slightly more friction, and a steel face the highest. Many shallow parts can be produced on a Masonite die faced with thin sheet metal. Trimming the width of the flange on a blank will often give enough control to stop wrinkles or folding. Any desired amount of grip can be obtained by cutting the edge of the die so that the blank is bent varying amounts, see Fig. 35. Section AA will have enough grip to break the metal but is being used here to hold the end so that a wrinkle or fold will not develop. Metal must flow in at B-B so that the center, which is drawn most, will not split at this

FIG. 39—Means for overcoming piercing of rubber by locating pins.



point. Wrinkles will develop in the flange at section C-C if the metal flows too freely; hence, the back edge is cut in a shallow step to retard the flow of metal. A shallow groove will also give local control. At the center, care must be taken to cut both sides alike or the metal will flow only on one side leaving no flange.

### Use of Pressure Pad

As noted previously, the flow of metal into a die cavity is controlled to a large extent by friction between the rubber and the sheet metal. Since rubber must flow into the cavity to fill it, there is a tendency to pull more metal into the die than would occur in a mechanical press. In order to get an even flange, the rubber must, therefore, be controlled. A surface outside the blank having a high coefficient of friction with rubber will hold the rubber at that point. According to work done by the Bureau of Standards, smooth metal will give the highest friction. Fig. 36 shows a die having flat surfaces which produce even flanges. Fig. 37 demonstrates the use of a pressure pad. A pressure pad should be used on fairly small parts as a large thin sheet of metal becomes difficult to handle for each part to be formed. In Fig. 38 a punch is used with a pressure pad. Deep forming may be done in two operations. Rubber is used to start the metal into die. In the second operation the punch is placed into the partly formed piece and completed.

By selecting materials carefully, considerable control of the gripping power of the pressure pad may be exercised. Masonite has low frictional properties, but may be controlled locally by scraping relief spots to allow more slipping or by changing the width. A wider section will receive more force from the rubber and thus have greater gripping power. Sheet Kirksite has higher frictional properties and may be scraped or bent to get local control. Since Kirksite is stronger than Masonite, thinner pressure pads can be used so that the rubber will flow deeper into the die cavity. Thin sheet steel provides a high gripping power and will allow uniform distribution of pressure. The holding power of any pressure pad depends, of course, on the material used to face the die.

### Locating Parts

Proper means of locating parts on a rubber forming tool are necessary in order to have greater accuracy. Parts are inaccurately formed when locating pins bend due to the force of rubber pulling a flange down over a



radius. Hard cyanided cold rolled steel locating pins should be used.

Long pins cut the rubber pad, see Fig. 39 A. A rubber washer placed over the pin as at B will prevent cutting to some degree. When possible, locate parts with a removable locating pin such as shown at C, made from a standard AN-456 rivet and rubber tubing. When parts are to be located on a larger diameter hole, a diamond pin (Fig. 39 D) will locate part and will not damage rubber pad.

On large diameter holes such as torque tube holes and lightning holes, a tapered plug with a radius that will not spread or nick on locating edge is advisable. Fig. 40 shows a plug which will give accurate locating.

Nesting blocks give quick locating and will not damage rubber pad. They are more convenient when large parts are placed on form blocks. They can be used in combination with pins, see Fig. 41.

There are certain conditions when a spring clamp is necessary to hold part against a nest and on locating pins. A spring clamp should be used to prevent the part from jumping off a form block when the sliding table enters the press. Fig. 42 shows some applications of spring clamps.

Tools should be designed with careful consideration for rapid loading and unloading. Proper locating of parts as well as methods of holding parts while forming will increase the quantity of parts per day.

#### Notes on Block Construction

The results described in this article have been based on form blocks constructed of Masonite and steel.

Masonite is made of wood fibers and a plastic that is poured into large molds, heated and then compressed to form hard sheets. While Masonite has a high compressive strength, approximately 40,000 lb. per sq. in. on the flat and 30,000 lb. per sq. in. on edges, its tensile strength is low. Because of the low tensile strength factor, certain precautions should be observed. Likewise, because of the laminated make-up of Masonite, the slightest nick on a corner of a block will cause the block to split horizontally. Dirt, small bits of rubber and soapstone or powder collecting on the blocks are the causes of splitting.

When blocks become pitted on the surfaces, they are no longer serviceable. Pitting caused by dirt and soapstone wears the surface of the blocks unevenly and crack solely by the pressure of the rubber. Soapstone is used to keep rubber dry and should be used according to amount of excess oil on blocks and other lubricants

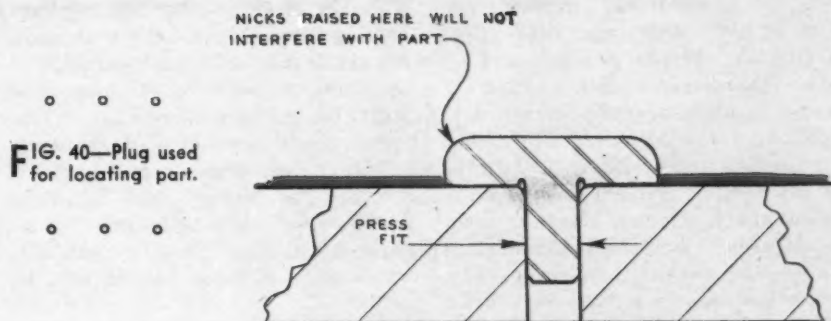


FIG. 40—Plug used for locating part.

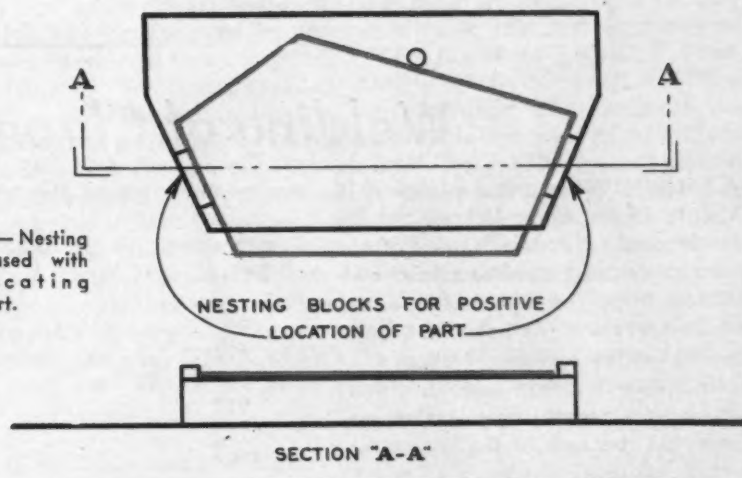


FIG. 41—Nesting blocks used with pin for locating part.

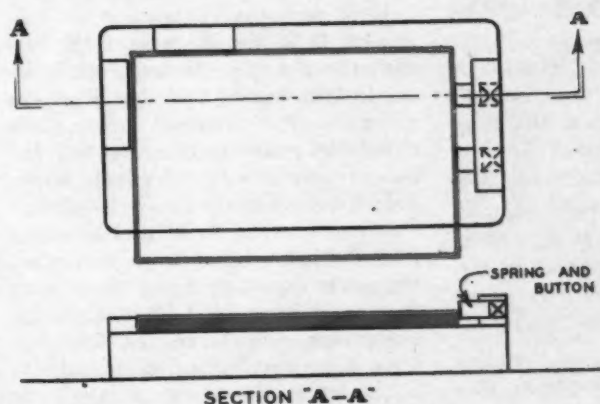
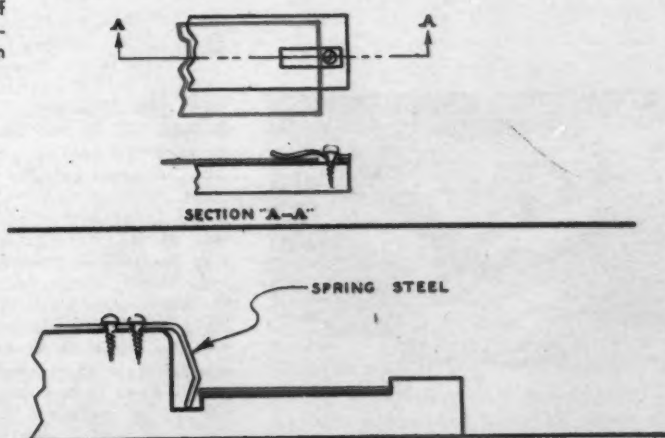


FIG. 42—Use of spring clips to retain part to form block.



from the press itself. Excess soapstone or powder has very little effect on friction whereas moisture and oil have. Therefore, a thin coating of powder is necessary only once a day.

Joining pieces of Masonite together to withstand the pressure of the rubber is a tooling problem that requires careful study. Placing Masonite tools on a Masonite base with screws and dowels often results in splitting. The screws and dowels having very little bearing area shear at the base. The base being Masonite cannot resist this force, crushes and splits. Using steel bases on forming blocks is advisable

since the steel base has much greater holding force. Small bolts with washers are found to be the best mechanical joint, but parts of the form block must be matched perfectly or else splitting will start at all high points.

Larger bearing areas must be achieved to prevent tool breakage. Along with small bolts and dowels, parts should be glued so that the whole area of parts should hold together.

Tests were made for proper gluing of joints. The surfaces to be joined were prepared by sanding. Each surface was placed against the sanding

wheel. It was found that by holding the surface against the wheel without moving the surface back and forth, the sanding wheel produced circular grooves on the block. The grooves thus acted as dams for the glue. Then the blocks were clamped together and left to dry. Specimens were tested for time of drying. Blocks split at the joints after 3 hr. After 24 hr. joints held firm. Joints were still stronger than the material after three weeks. Further tests on older joints were tested and were found to split. The glue lost its holding force when completely dry.

## Welding of Chromium Steel

**C**HRONIUM steels containing 16 to 18 per cent of chromium are widely used in Russia instead of the more expensive "stainless steels" containing 18 per cent chromium and 8 per cent nickel. Their important drawback is the low corrosion resistance of their welds. I. Lévin and M. Novitskaya, in a recent investigation, noticed that the zone of the lowest corrosion resistance was some 0.8 to 0.12 in. distant of the central line of seam, and concluded that the corrosion was the highest after heating to a temperature considerably below the melting point.

The steel used contained C 0.10, Cr 16.35, Si 0.34, Mn 0.51, P 0.19, Ni 0.25, and traces of S. It was available as 0.08-in. thick sheets, rolled at 1832 deg. F. and normalized at 1400 deg. F. for 10 min. Samples of this steel were kept at a temperature T for 30 min., cooled in air, and immersed in 60 per cent nitric acid at 248 deg. F. for 48 hr. The loss of weight  $\Delta W$  was determined then and calculated in lb. per sq. in. per hr. The

results are given in the table below.

Temperature, Deg. F.	$\Delta W$ , Lb. Per Sq. In. Per Hr.
32 .....	111
392 .....	98
572 .....	98
752 .....	83
932 .....	126
1112 .....	23
1382 .....	17
1472 .....	15
1652 .....	59
1832 .....	81
2012 .....	78

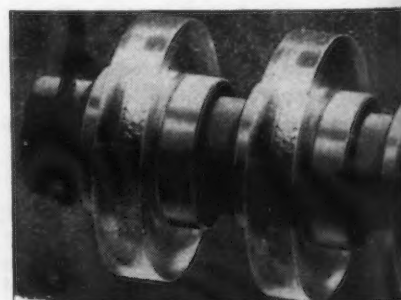
It is seen that annealing at 1292 deg. to 1472 deg. F. reduces the corrosion to a negligible level, but heating to 1832 deg. to 2012 deg. F. raises it again. The corrosion takes place along the grain boundaries, and the loss of weight is due chiefly to whole grains falling out of their "sockets." This explains the striking observation that the loss of weight is less when the annealing at 2012 deg. F. is more protracted (that is, 4 hr.); when the grains are very large (as they are after a long heat treatment) the 48-hr. attack by nitric acid is not suffi-

cient to work under the grain and to separate it completely from the parent metal. The low corrosion resistance of the grain boundaries is probably due to a low concentration of chromium in the external layers of the grains; and annealing at 1292 deg. to 1472 deg. F. presumably equalizes the concentration of chromium everywhere within a grain.

These results show that welding of chromium steel should be followed up by annealing of the weld for 30 min. at 1292 deg. to 1472 deg. F. If this is impossible and the weld is likely to come in contact with highly corrosive liquids, chromium steels should not be used. Instead, a steel C 0.05, Mn 0.56, Si 0.43, Ni 1.02, Cr 15.72, Ti 0.35 is recommended. Its corrosive resistance is independent of the previous heat treatment (between 1292 deg. to 2012 deg. F.). The improvement is probably due to titanium, which forms very stable and insoluble carbides. It is not certain that the titanium concentration used in the just mentioned alloy was the best one; the experiments were not yet concluded at the time of the report.



**P**LEXIGLAS masking jigs are now used exclusively in the copper plating of carbon rings by the Morganite Co., Long Island City, manufacturer of carbon specialties. Because of its machinability, dimensional stability and light weight, Plexiglas not only reduces rejects but also steps up production rates. Carbon rings to be plated are inserted in grooves 1/64 in. wide on either side of the Plexiglas jig rings. They are then mounted in gang fashion on a carbon rod (right), electrodes are attached and the entire assembly is suspended in a plating solution. The durability of these Plexiglas jigs and their resistance to the plating solution make them highly practical. View at left shows carbon rings plated except for narrow rim protected by the masking jig, right.





By J. R. MAHONEY  
University of Utah

# The Western Steel Industry

**J**UDGMENT of the chances for the successful postwar functioning of the Geneva steel plant must be based on an appraisal of a complex set of economic factors; chiefly, the availability, quality and costs of raw materials, the appropriateness and efficiency of the plant facilities and the location, extent and availability of markets.

An ample reserve of coking coal in central Utah, with prospect of additional nearby sources following more complete exploration, should satiate requirements of Geneva for years to come. Suitability of coke produced from these coals for modern blast furnace operation has been questioned, but modifications in coking practice have largely overcome difficulties. Coke from Utah coal has been used successfully for almost 20 years in the blast furnace in the Columbia Steel Co. plant at Ironton, Utah; for the last year in the large blast furnace at Fontana; for several months in an additional furnace at the Ironton plant and more recently in the large new furnaces in the Geneva plant. This coal can be cheaply mined and delivered to the ovens at costs comparable to Eastern and Southern steel centers, and far cheaper than to the Kaiser ovens at Fontana, which is an 807-mile haul.

Lack of exploration prohibits complete appraisal of the extent and quality of iron ore resources that will be available to the Western blast furnaces and the effect that these will have on the chances for the successful operation and the future growth of that part of the Western steel industry dependent upon basic raw materials. However, there is geologic justification for the assumption that when explorations have matured, adequate reserves will become known.

Southern Utah deposits, 232 miles distant from Geneva, currently provide cheap ore with equal or lower mining costs than the open pit mines on the Mesabi. Perhaps the greatest difference in the cost of iron ore in Utah as compared with Minnesota is ac-

**. . . The war spurred expansion of Western steelmaking capacity has created the problem of its future outlook, the ramifications of which were examined Sept. 7, p. 60, in THE IRON AGE by C. T. Post, in the article, "Western Steel—A Riddle of Uncertainties." The report of J. R. Mahoney, director of economic and business research, University of Utah, of which this is an abstract, differs considerably with the conclusions of C. T. Post. The report evaluates such economic factors as costs, plant efficiency, price and possible markets. Most logical field for the new Western plants, Dr. Mahoney concludes is that of exports to China, the Philippine Islands and the Netherland Indies. In addition to its business possibilities, such revitalization of the Far East would act as a checkmate against the future strength of Japan. A previous report by Dr. Mahoney on the future of Western steel plants appeared in THE IRON AGE, Sept. 23, 1943, p. 85.**

counted for by Utah taxation, which will average 4c. per ton, as compared with a 10-year average of 71c. per ton for Minnesota ore. The favorable comparison also holds for Birmingham. Alabama ores average 37 per cent iron as compared with 56 per cent for Utah ore, necessitating the mining and shipping of approximately one and one-half times as much ore for Alabama as for Utah, and are handicapped by the expense of mining at great depth and pumping large quantities of water.

Cost of transporting iron ore for Pittsburgh is more than double that for Geneva; Gary is 20 per cent greater than Geneva. Ore brought from Chile for Sparrows Point is reported to cost from \$1.45 to \$1.60 per gross ton at Cruz Grande docks, plus ocean freight and tolls of \$3.35 to \$3.85, making a total, delivered, of \$4.80 to \$5.45 per ton.

In Table I, the estimated comparative costs of the raw materials required to produce a ton of pig iron at the Utah blast furnaces and those at Pittsburgh, Gary, Birmingham, Fontana and Sparrows Point are shown.

## Sources of Ferroalloys

Growing importance of alloy steels and use of certain ferroalloys in steel-making practice emphasizes the importance of raw materials for their production. Cheap and abundant electricity is a major factor in the West's

favor, for many ferroalloys are produced in the electric furnace. Wartime necessity has proven that many ferroalloy ores formerly imported, such as manganese, chrome, tungsten and vanadium, are available in substantial quantities in the West, in some cases within a relatively short distance of Geneva. Molybdenum abounds in the Rocky Mountain region. Another raw material essential to the steel industry, fluorspar, will be produced in ample quantities in Utah.

## Scrap Steel Considerations

Important changes in the Western steel industry may arise from the altered relation between pig iron and scrap and possible changes in the price of scrap. Outside of the steel plant at Pueblo, Western steel manufacturing has been based primarily on scrap. Columbia Steel's blast furnace at Ironton, Utah, near Geneva, supplied the major portion of the pre-war needs for pig iron in the furnaces on the Pacific Coast. There were also some shipments of pig iron from Eastern and Southern blast furnaces and some was brought in from foreign countries.

Counting Geneva, the region west of the Continental Divide now has 3,581,020 net tons of annual steel furnace capacity as compared with 1,087,520 before the war, an increase of 229 per cent. Because many of these in-

stallations will depend wholly on scrap, and all will utilize some scrap, demand should zoom. Pig iron capacity has been increased in the same region from 204,300 to 2,086,300 net tons of annual capacity.

Since most scrap comes from the operation of the steel furnaces and rolling mills, supply will increase, particularly, at Geneva and Fontana. There it will be available for charging the furnaces of these two plants.

The greatest change from prewar conditions is likely to be in the Los Angeles area, where Kaiser's Fontana mill is located, and this may lead to draining some of the scrap from central California. Considered in connection with the diversion of much of the surplus in the Mountain States to Geneva and the reduction or possible elimination of the surplus in the Pacific Northwest, the possibilities are that the entire West may be transformed from a surplus to a deficit scrap area.

Excess pig iron capacity in the Provo area can be drawn on to supply the needs of any or all three of the Pacific Coast steel producing centers. The possible effects that these changes may have on the economic position of some of the Western plants may be important. Scrap costs

may, under the circumstances, be increased and at the same time, the sale price of steel products may be reduced substantially. Western steel plants have been able to operate under an umbrella of high prices that have been prevalent because Western steel capacity has not been sufficient to remove the necessity of importation of steel products from Eastern steel centers.

The extent of postwar changes in scrap prices in the West will depend largely on mill operating rates there. If the rate is low then scrap will still be available in such excessive amounts as will perpetuate the low prewar price structure. If, on the other hand, the steel mills, including the new ones, are able to operate even at moderate capacity then it would seem possible that the Western situation would be altered sufficiently to make a material change in the supply-demand relationships and hence the prevailing scrap price.

#### Future Cost Changes

Some of the features used to indicate relative costs of steel production in the West are subject to changes in the future. Among these is the present freight rate on the shipment of coking coal from the

Utah mines to the Geneva plant which is probably somewhat greater than is justified.

Since the present known reserves of iron ore in the southern Utah region are not sufficient to furnish a continuing source of supply for the Geneva plant, it will be necessary to shift to other sources of iron ore at some later date. In all probability this will bring changes in costs of mining and freight rates. Such a change is likely to be at a later date, however, than the exhaustion of the high grade, easily worked large deposits on the Mesabi range which will require some increase in iron ore costs to the Eastern steel mills. Since Geneva already has a substantial advantage over Pittsburgh and Gary in costs of producing pig iron a considerable increase in the cost of iron ore for the Geneva plant could occur before its advantage over the Chicago and Pittsburgh region would be eliminated.

The previous discussion on the probably competitive position of the Geneva plant has been based on the assumption of the same basing point prices as those prevailing at Eastern steel producing centers. The raw material situation is favorable enough to permit a base price somewhat lower. This possibility would depend upon the maintenance of a high capacity of operation for the Geneva plant. These two factors are very definitely related to each other since the lower the cost at Geneva, the more extensive its markets will be and the greater the chance, therefore, of higher capacity operation. These lower costs will give the Geneva plant a larger part of the West Coast market and permit larger sales to the East beyond the Mountain States.

Since the limited extent of the market will be the most difficult problem with which the Geneva plant will have to contend, this policy of reducing prices to attract consuming industries and to expand its market will be the most direct way of improving the operating capacities. The favorable raw material situation may afford the margin of economic advantage that will be required during the early years of its operation to achieve a solid position in the Western economy.

The cost position and pricing policies of the Geneva plant will also be influenced by the thoroughly modern equipment. It can be concluded that virtually every improvement in capital equipment is cost reducing. Some improvements may affect the quality but not the costs. It is the cost reducing features which constitute the chief measure of success of im-

TABLE I  
Cost of Materials per Ton of Pig Iron

	Iron Ore	Coke	Flux	Total
<b>Birmingham</b>				
(Value of ore at mine, 2.7 tons at \$1.65).....	\$ 4.45	1.65 tons of coal at \$2.28 (2350 lb. of coke).....	\$ 3.76	
Cost of assembly.....	1.25	Cost of assembly.....	1.64	
	\$ 5.70		\$ 5.40	\$ 11.40
<b>Gary</b>				
(Value of ore at mine, 1.85 tons at \$2.59).....	\$ 4.80	1.38 tons of coal at \$2.03 (1900 lb. of coke).....	\$ 2.80	
Cost of assembly.....	3.52	Cost of assembly.....	3.99	
	\$ 8.32		\$ 6.79	\$ 15.56
<b>Pittsburgh</b>				
(Value of ore at mine, 1.85 tons at \$2.59).....	\$ 4.80	1.38 tons of coal at \$2.01 (1900 lb. of coke).....	\$ 2.77	
Cost of assembly.....	5.88	Cost of assembly.....	.31	
	\$10.68		\$ 3.08	\$ 14.21
<b>Utah</b>				
(Value of ore at mine, 1.85 tons at \$1.00).....	\$ 1.85	1.60 tons of coal at \$2.20 (1800 lb. of coke).....	\$ 3.52	
Cost of assembly.....	2.78	Cost of assembly.....	2.16	
	\$ 4.63		\$ 5.68	\$ 10.76
<b>Sparrows Point</b>				
(Value of ore at mine, 1.46 tons at \$1.52).....	\$ 2.22	1.25 tons of coal at \$2.01 (1720 lb. of coke).....	\$ 2.51	
Cost of assembly.....	5.26	Cost of assembly.....	3.75	
	\$ 7.48		\$ 6.26	\$ 14.19
<b>Fontana</b>				
(Value of ore at mine, 1.85 tons at \$1.00).....	\$ 1.85	1.6 tons of coal at \$2.20 (1800 lb. of coke).....	\$ 3.52	
Cost of assembly.....	3.05	Cost of assembly.....	6.96	
	\$ 4.90		\$10.48	\$ 15.83



provements and the chief incentive for their installation. The cost advantage that will arise from Geneva's thoroughly modern equipment and its well planned facilities will be greatest during that early period of operation when it will be most needed. Modern improvements which reduce costs are also usually labor saving. This will mean that the amount of labor required to produce a given output at the Geneva plant is likely to be less than at any other plant in the United States.

The greater the capital investment in modern equipment the more significant are the capital costs and the more necessary it is to seek cost reductions through more complete utilization of the plant. This is the basis for much of practice known as rate absorption. It would mean that the Geneva plant, because of its very high proportion of capital costs would have much to gain from increasing the ratio of its operations by extending its sales into region beyond those in which it has a rate advantage over other plants. This principle has been used by some to indicate the difficulty that would arise for Geneva by other plants invading its normal market area, but it is a principle than can work both ways. The most likely places for this would be in some of the markets in the Missouri River valley, in Texas and in Oklahoma. It might also achieve this same result by taking a larger proportion of the Pacific Coast markets.

As a basis for showing the possible industrial effects of the wartime expansion in steel plants in the 11 Western states, the historical development of the principal producing and consuming divisions of the iron and steel industry up to 1939 in proportion to population may be significant. (See pie charts on this page.)

### New Western Steel Plants

(1) **Fontana:** The Fontana, Cal., plant of Kaiser Co., Inc., is located approximately 50 miles east of Los Angeles and was built with a \$90,000,000 RFC loan. Raw material handling is principally by belt conveyor, with a considerable degree of flexibility. The by-product coke plant consists of two batteries of 45 ovens each, which together require 1728 tons of coal to normally produce 933 tons of coke daily. The 1200-ton blast furnace, among the largest in the country, is charged with approximately one third sintered ore and two-thirds prepared sizes as mined, as is Geneva. For each ton of pig produced approximately 1800 pounds of coke are required.

The open-hearth plant consists of six furnaces, each of 185 tons capacity. One of these is of the tilting type which would adapt it for use in duplexing processes. The annual capacity of the open hearth furnaces is 675,000 net tons.

The largest of the finishing mills is designed to produce 300,000 tons of finished plates per year. The plate mill is a single stand 3-high reversing type and is equipped to roll plates up to 100 in. wide. The structural mill is equipped to roll a variety of products including rounds and squares, flats, angles, I-beams, wide flange beams, channels, bands-strip and reinforcing bars. The annual capacity for structural shapes is 90,000 net tons. For bars and strip up to 16 in. wide and rods ¼ in. to ½ in. the capacity is 82,000 net tons.

The efficient plant layout and the modern design of most of its facilities should contribute to the postwar utilization of this plant. The most obvious disadvantage is the high cost for pig iron arising from heavy transportation expenses involved in the assembly of raw materials. Escape from high cost pig iron may be open through use of a larger proportion of scrap in the charge. Other difficulties may arise because of the restricted size of the market for some of the products and competition from other plants. This is the only Pacific Coast plant to be equipped with blast furnace facilities.

(2) **Geneva:** The \$190,000,000 Geneva steel plant, 40 miles south of Salt Lake City, Utah, was engineered and constructed by United States Steel Corp. subsidiaries for Defense

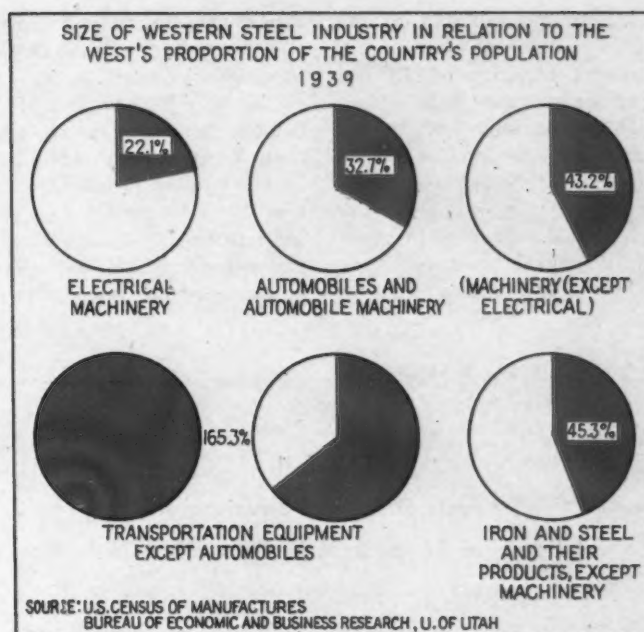
Plant Corp. Factors in this choice of location were (1) junction of rail, roads over which raw materials are assembled; (2) location at the apex of railroad lines which fan out to the three principal Pacific Coast markets and those running to the north, east and southeast; (3) favorable water supply; (4) labor supply; (5) availability of various other utilities.

The by-product coke plant is of the underjet type and consists of 252 ovens in four batteries with an annual capacity of 1,094,000 tons of coke which will require 2,300,000 tons of coal. Three blast furnaces with 1100 tons daily capacity each will make a combined yearly total of 1,150,000 net tons of pig iron. Nine 225-ton open hearths provide an annual ingot capacity of 1,280,000 net tons.

The mill is equipped with a single stand 45-in. slabbing and blooming mill which may either produce blooms for the structural mill or slabs for the plate mill. The 132-in. semi-continuous plate mill has a capacity of 700,000 net tons of finished plates per year, from 3/16 in. to 1½ in. gage in most widths. The structural mill has an annual capacity of 200,000 tons with products as indicated in Table II. Its potentialities with certain additions also are described in the table.

### Older Western Mills

Finishing facilities of the older steel mills in the 11 Western states are heavily concentrated in a few products, particularly bars. Annual capacity of 321,264 tons of reinforcing bars and 265,000 tons of other types is in excess of consumption in most



years, and Fontana will add to the surfeit.

To a present capacity of 180,208 net tons of heavy and light structural steel will be added 90,000 by Fontana and 200,000 by Geneva — more than could be absorbed unless brisk shipbuilding or extensive construction prevailed. Concentration of Geneva on larger structurals or of Geneva and possibly Fontana on pier-

ing rounds for tubular products not now made in the West might provide considerable relief.

Colorado Fuel & Iron Co.'s 347,000 net ton rail capacity is probably more than adequate to meet the normal Western demand, but because of location Fontana or Geneva may find a basis to modify their rolling facilities and enter this market. Geneva now is equipped to roll splice bars and

tie plates, as is C. F. & I., and Bethlehem and Columbia on the Coast.

### Flat Rolled Possibilities

The gaping void in Western production is flat rolled products, with only 10 per cent of all consumption capable of being made locally, and only in restricted sizes and types of products. Building of Geneva and Fontana, with a preponderance of their capacity in this field, opens new vistas even though plate capacity alone was installed to meet wartime demand. The Geneva plate mill is so constructed that it may be modified to produce virtually the entire range of flat rolled products in almost any desired width from 132 in. down to the economic limits and any gage from thick plate down to the thinnest of gages required for tin plate for the canning industry. (The Western market requires approximately one-third of the tin plate used by the entire country). The modification will require a slab edging press or squeezer, to square the edges and adjust the width, which would be installed just ahead of the 4-high reversing roughing mill and two additional stands of 4-high finishing units to supplement the four already installed to reduce the gage sufficiently for strip and sheets. These will convert the four-stand unit into a six-stand continuous finishing unit. When the mill is used to produce plates, the steel will idle through the last two stands as is now being done at the Steel Corporation's Irvin Works.

It also would be necessary to add two coiling machines at a point in the run-out table beyond the finishing stands because nearly all of the thinner than plate gages of flat rolled products are coiled to facilitate effective handling in all of the steps beyond.

### Western Steel Markets

Since the Western market is not large enough to permit Geneva's use for plates or the thinner than plate gages alone, the combination of equipment to permit use for both purposes will be the greatest single step that can be taken both for a satisfactory volume of operations and to meet the special needs of the Western market.

Fontana's equipment, too, is designed to produce plates, but this could be supplemented so that it could also roll some thinner than plate gages. However, this would be by the methods that are rapidly being replaced by the continuous mill in the main steel centers of the country.

Dependable statements have been secured of the amounts of various

TABLE II

### Products of Geneva Structural Mill

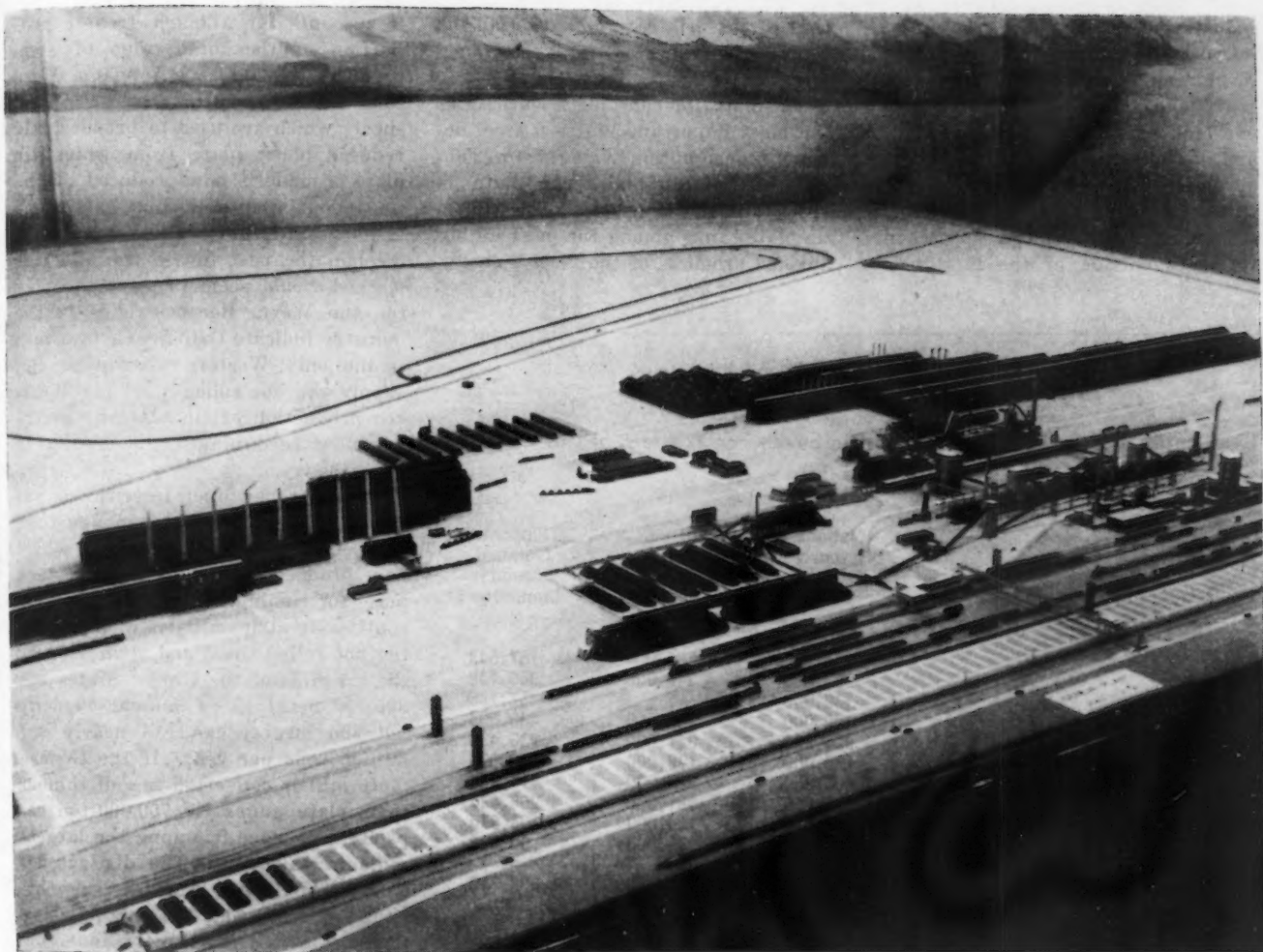
#### Part I—Product Range of 32 in. to 26 in. Structural Mill As Now Designed

Product to be Rolled	Customer Use
Standard beams, 6 in. to 15 in.	Fabrication of ships, buildings, bridges, machinery, electrical equipment, road and harbor equipment, miscellaneous steel structures.
Standard channels, 6 in. to 15 in.	
H-beams, 4 in. to 6 in.	
Equal angles, 3 in. to 8 in.	
Unequal angles, 4 x 3 in. to 9 x 4 in.	
Flats and bars, 4 in. to 8 in. wide	
Finished rounds, 2 in. to 6 in.	
Piling 15 in. and 16 in. small flat web	
Ship channels, 6 in. to 13 in.	
Bulb angles, 4 in. to 10 in.	
Zee bars, 3 in. to 6 in.	
Tees, 3 in. to 6 in.	
Semi-finished blooms, 6 in. to 10 in.	For re-rolling or forging into finished steel products.
Semi-finished forging rounds, 4 in. to 10 in.	
Semi-finished billets, 2 in. to 6 in.	For pipe manufacture.
Skelp, 6 in. to 15 in.	
Special sections, 6 in. to 15 in.	For automotive and various other industries.
Tie plates, 8 in. to 18 in.	Railroad construction and maintenance.
Cross ties, for 45 lb. to 100 lb. rails	
Splice bars, for 45 lb. to 100 lb. rails	
Draw bars, 6 in. to 15 in.	

#### Part II—Additional Products of 32 in. to 26 in. Structural Mill with Certain Mill Alterations and Additions

Product to be Rolled	Customer Use	Alterations Required to Mill Facilities
Arch web piling, 16 in. to 20 in.	Fabrication of ships, buildings, bridges, machinery, electrical equipment, road and harbor equipment, miscellaneous steel structures.	Purchase two roll stands and one pinion stand.
H-beams, 8 in.		
Standard beams and channels, 15 in. to 24 in.		
Light beams and joists with parallel flanges, 6 x 4 in. to 12 x 4 in.	Fabrication of ships, buildings, bridges, machinery, electrical equipment, road and harbor equipment, miscellaneous steel structures.	One universal roll stand with one pinion stand.
C B sections 8 x 5 in. 8 x 8 in.		
Rails 30 lb. to 100 lb.	Railroad construction and maintenance.	Equipment for cambering, stamping, slow cooling, gagging, punching and cold sawing.





... Scale model of the Geneva steel plant.

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types of steel products consumed in the West before the war (Table III) but these may not be reliable measures of future markets. The level of the United States' postwar economy should top the thirties; the West has gained a larger share of the country's economic activity during the war, and further market expansion may evolve from possible aid to China and the Pacific regions. It is necessary to consider not only consumption of products "as rolled," but also steel used in making the products purchased by people in the West but fabricated in other parts of the country. Wartime expansion of Western steel capacity should widen Western fabrication and manufacturing both by making available important additional types of steel and by reducing the price of this steel to Western buyers.

In 1940 approximately two-thirds of all the steel moving from the Eastern and Southern states to the three Pacific Coast states, amounting to 1,391,194 tons, came via the Panama Canal. An estimated 686,000 tons came by rail to the three states. The other Western states took another 338,000 tons by rail. Added to this interstate movement of iron and steel

products, approximately 900,000 net tons were produced in the Western states with nearly two-thirds of the production that year in California and the remainder in Colorado, Utah, Washington and Oregon.

Approximately half of all this tonnage moving through the Canal had its origin at Baltimore. Mobile, Ala., accounted for 16 per cent; Philadelphia, 12 per cent; New York, eight per cent, and New Orleans five per cent of the remainder. Nearly one-half of the intercoastal canal steel movement is in company ships, principally and almost equally owned by Steel Corporation and Bethlehem subsidiaries, providing the basis for lower transportation costs than those published and charged by the regular steamship lines.

The Canal Record, which classifies tin plate separately, shows that approximately one-half of the estimated 526,000 net tons consumed in the West in 1940 came by boat, the balance moving by transcontinental rail.

The strongest competitors of the Western steel plants are most likely to continue to be Bethlehem's Sparrows Point plant, and the Steel Corporation's Birmingham plant. Other plants located inland in eastern Pennsylvania, at Pittsburgh and around Chicago must also be considered as competitors on a rate absorption basis.

The fact must not be lost sight of that the basic costs of all of these plants are not the same and a strategic location at or near an ocean port may be offset in whole or in part by higher costs of mining or assembling the raw materials, as at Sparrows Point. It has required a higher price for finished steel in the territory contiguous to some of these Eastern plants to offset the high raw materials costs.

The 11 per cent of the country's total population living in the Western states often conveys the impression that the West is as yet too small to support large units of industrial production. On close examination, however, it is clear that the West has developed certain economic activities to an extent far beyond its proportion of the population, such as the canning

industry, petroleum and natural gas, metal and certain types of non-metallic mining, lumber, shipbuilding, aircraft and light metals. The West's enormous resources of hydro-electric and non-metallic fuels also beckon for development in other lines. It is also true that in many other segments of economic activity the West accounts for a proportion of the total below

that of the relative population and in some cases there is no Western activity.

Tin plate for containers constitutes the most important Western steel demand, consumption rising from 256,000 tons of tin and terne plate in 1926 to 431,000 tons in 1942. Since tin plate ranks among the most highly finished products of the steel industry

it accounts for a much greater proportion of the total value of steel products than of total tonnage. More than 90 per cent of the strip and sheets which are used to produce cold reduced black plate from which tin plate is made is now produced by the continuous strip mills that have come to dominate the field of flat rolled steel in the past few years, and this method would seem to point the way for the West. Recent trends in the industry indicate that the Geneva mill is the only Western plant that can supply the hot rolled steel for Western production of tin plate by methods now used almost universally in the industry.

Tin mills can operate with an annual capacity of smaller tonnage than the continuous hot strip mills which now produce nearly all of the black plate for tinning. The smallest of the continuous strip mills now supplying the hot rolled sheet and strip used by the tin mills of the United States has 326,000 net tons of annual capacity but the largest can roll nearly one million tons per year. If the Geneva plate mill is converted to roll thinner than plate gages its 700,000-ton capacity will place it among the largest mills of this type. The distinct advantage of Geneva over other possible sites for cold reduction and finishing facilities arises from the economy of supplying the Western market from the center rather than from points on the outer circle—the same advantage enjoyed by Pittsburgh and eastern Ohio points.

**TABLE III**  
Consumption of Rolled Steel Products in Seven Far Western States\* for 1937 in Net Tons

	National Resources Planning Board	Kaiser Steel Company	Temporary National Economic Committee
Plates	185,000	185,000	157,543
Sheet	303,000	346,000†	305,153
Strip	38,000	†	37,136
Tin plate	400,000	400,000	436,603
Total flat rolled	926,000	931,000	936,435
Structural	128,000	128,000	140,096
Bars	300,000	313,000	411,238
Tubular	375,000	381,000	266,434
Rails and tie plates	105,000	154,000	103,575
Other	200,000	30,000	50,932
Total	2,034,000	1,937,000	1,908,710

\* Includes Washington, Oregon, California, Nevada, Arizona, Idaho, Utah.  
† 346,000 includes both sheet and strip.

**TABLE IV**  
Ton-Miles Required to Assemble Raw Materials for One Ton of Pig Iron

Steel Producing Centers	Iron Ore	Coal	Flux	Total
Provo	452	173	10	635
Fontana	309	1,212	1	1,522
Pueblo	690	143	42	875
Birmingham	22	24	3	49
Gary	304*	723	10*	1,037
Pittsburgh	559*	24*	21	604

Total Ton-Miles to Assemble Raw Materials for One Ton of Pig Iron and Ship One Ton of Steel From Producing Centers to Pacific Coast

	Los Angeles	San Francisco	Portland	Seattle
Provo	1,382	1,495	1,572	1,748
Fontana	1,580	2,048	2,665	2,847
Pueblo	2,163	2,431	2,365	2,458
Birmingham	2,165	2,663	2,725	2,889
Gary	3,295	3,297	3,327	3,250
Pittsburgh	3,228	3,332	3,335	3,258

\* Much of the distance over which the iron ore travels to both Gary and Pittsburgh is by water through the Great Lakes. In the table the water distances were adjusted to show equivalent rail distances on the ratio of 9.4 water miles for one rail mile. An adjustment was also made for Pittsburgh, 3.3 river miles for coal were figured as equal to one rail mile. Flux to Gary was corrected in the same way as the iron ore.

#### Tubular Demand

Adjusted figures indicate a total consumption of 612,000 net tons of iron and steel pipe and fittings for the 11 states of the West in 1940, and 711,000 tons in 1942. If those portions of Kansas, Nebraska, North Dakota, South Dakota, Oklahoma and Texas are included, which possibly could be reached from Geneva, the total is 884,000 for 1940 and 1,023,000 tons for 1942. In the 17 states, approximately 450,000 tons of pipe and tubing went to the oil and gas industry in 1940. Next to tin plate, this is the largest sales opportunity. Although either Fontana or Geneva could supply piercing rounds for a California mill, Geneva would have the advantage of a wider economic sales area encompassing the Rocky Mountain states as well as the oil fields to the southeast.

Pacific Coast shipbuilding for various reasons should be considered an important part of the potential post-war demand for steel, although hard to estimate. Housing, mining, fabri-





... General view of the blast  
furnaces of the Geneva Steel  
Works.

o o o

cating plants, construction, lumbering and other industrial consumers should take substantial amounts, although prewar demand offers only an inexact key to postwar possibilities. The extent to which the steel mills of the West can participate in trans-Pacific markets with their possible postwar expansion will depend primarily on whether Western plants produce the type of steel products required at a cost low enough to take advantage of the shorter ocean voyage.

#### Freight Rate Structure

The inland position of the Geneva plant magnifies the importance of railroad rates in any appraisal of its prospects for successful postwar operation. Data on relative ton-miles involved in transporting the materials of the steel industry are presented in Table IV to help clarify the fundamental factors that will determine the chances of successful operation, factors which reveal a more favorable situation for Utah than for any other producing region. It is recognized that the final basis of comparison should be actual money costs involved in mining and transporting these materials but these money costs are determined primarily by the physical factors brought out in these comparisons.

Favorable rates already have been established on some types of steel

products and there is no valid reason why low commodity rates should not be established on the complete line. The competitive situation among the railroads leading from central Utah to the Western markets will contribute to the establishment of rates that will move the traffic from Geneva. We may also expect a considerable revision on rates toward the East. The fact that the main products of Geneva are likely to be largely non-competitive with those of the Colorado Fuel & Iron Co. plant at Pueblo provides a more favorable situation for the granting of rates low enough to move these products into the markets of Colorado and beyond.

#### Determining Capital Values

One of the most important problems that will face the government and the operator of the Geneva plant when the present contract of Geneva Steel Co. terminates will be the fixing of a sale price for the plant. If the operation is to be on a leasing basis with the government retaining ownership, the same problem will appear in fixing appropriate rental. The capital costs that are to form the basis of negotiation by either of these methods must compensate for the above

normal costs incurred in the building of the plant under wartime conditions. The postwar value of many of the plants that have been constructed during the war will not be related directly even to their normal costs of construction. For many of these plants the capital value will be related directly to future earning possibilities rather than to past costs of construction or to costs of reconstruction.

The financial responsibility for any lack of balance that may exist between the capacity of the Geneva plant and the peacetime markets, such as excessive plate capacity, must be chargeable to the war program. The postwar operators of Geneva need not, therefore, bear the full burden of the capital costs as a necessary prerequisite to operation of the plant. The economic conditions may be favorable enough to permit the operators to meet these capital charges in full when reasonable discounts are made for excessive wartime costs, but if these conditions are not favorable, there will need to be an appropriate readjustment in the burden of capital costs. Where the market outlets are insufficient to provide for full scale operation of the plant the owner will be able to secure a return on the plant investment that will be measured by the surplus above the cost of operating the plant and this may vary be-

(CONTINUED ON PAGE 166)

# ... Welded Structures vs. Meehanite

IT is not the purpose herein to attempt to argue the points presented in a recent article.\* It is believed, however, that the implications of the article should be considered in the light of the additional data presented here. Fair comparisons can hardly be made when only one type

of diesel engine is considered. To conclude from this one instance that weldments are not justified as structural parts of heavy machinery is to base an opinion on an extremely limited foundation.

Are diesel engine parts—or those of other heavy machinery—designed

and used only on the basis of cost in moderate production? It is the writer's conviction from experience that deeper engineering significance is involved. The reader of the May 18 article\* must assume certain facts in addition to the statements given. He must assume that the "outside firms" cited in that article as having "reputations for ingenuity" did modify designs to "give maximum economy when produced in welded steel."

Possibly this did occur within limits. From an engineering standpoint, however, limits on modification must have existed. This is clearly a logical conclusion because welded steel or castings apparently can be substituted for each other at will in the engines on which L. F. Williams bases his opinions. If so, it is not logical to believe that full engineering advantage has been taken of a material—rolled steel plate—superior to iron in those physical properties of importance in structures subjected to fatigue and impact.

In many welded diesel engine frames steels are used with endurance limits of the order of 40,000 lb. per sq. in. and with impact ratings of the order of 30 ft.-lb. The modulus of elasticity is, of course, 29,000,000. Elongation in 2 in. can run 28 per cent and reduction in area in 2 in. can run 58 per cent. Allowable stress levels are established accordingly.

From this it can be assumed that the type of engine cited by L. F. Williams either has a frame unnecessarily overweight or else weight-saving is a minor consideration.

In applying welded construction to an item, there are certain definite basic factors which must be determined.

Can advantage be gained by redesign of the mechanism to realize on the value of the peculiar attributes of the proposed material and process? Is such redesign possible or practical? If not, can the part be safely or economically converted into a weldment?

If a weldment is not feasible from an engineering or economical aspect, then the only conclusion to be drawn is to "cast it." It is a waste of time

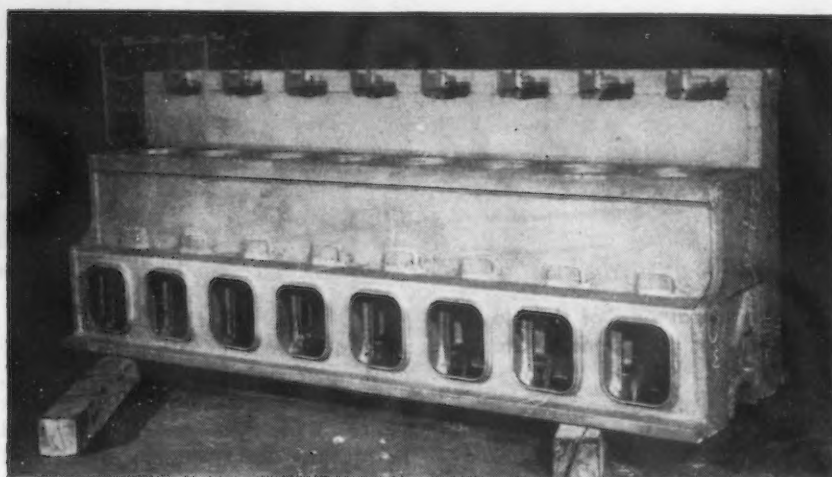


FIG. 1—Eight-cylinder diesel crankcase measuring 6 ft. 10 in. long by 2 ft. 7 in. high by 2 ft. wide and weighing approximately 2065 lb. This type is used as a marine auxiliary power unit.

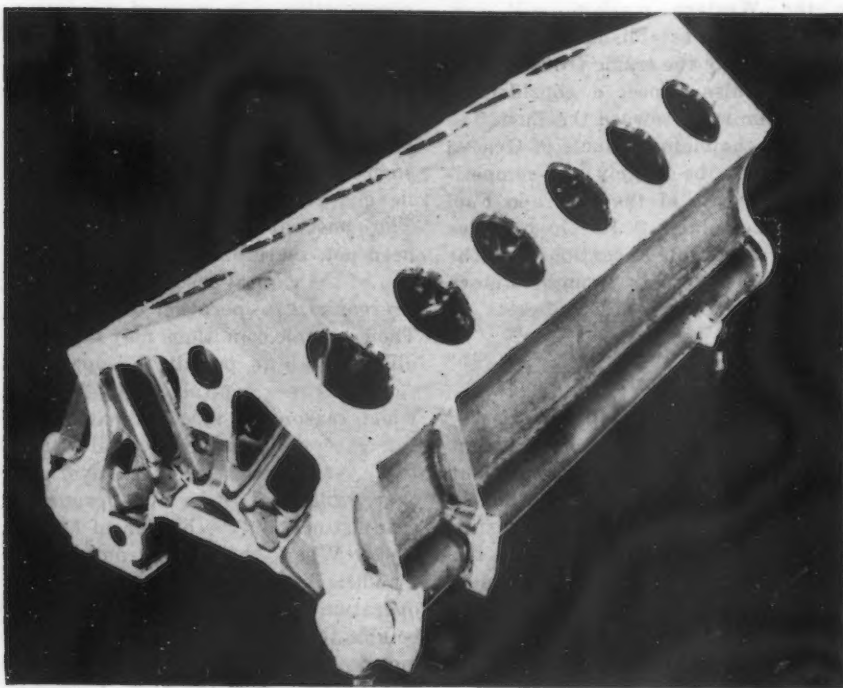


FIG. 2—Twelve-cylinder diesel engine 4 ft. 1 in. long by 1 ft. 9 $\frac{3}{8}$  in. wide by 1 ft. 3 $\frac{1}{2}$  in. high.

\* "Cost of Meehanite Castings vs. Welded Structures," by L. F. Williams, of the Cooper-Bessemer Corp., THE IRON AGE, May 18, 1944.



# Castings

... Design and physical characteristics of diesel engine frames and other "heavy" machinery made of welded steel plate, as compared with similar structures made of Meehanite castings.

BY EDWARD J. CHARLTON

Assistant to the President,  
Lukenweld, Inc.,  
Division of Lukens Steel Co.,  
Coatesville, Pa.

and money to misapply a material or process. Sooner or later, the item will revert to the material or process best suited to it.

The history of the use of weldments in diesel engines has been far less superficial than the reader is led to believe from the Williams statement that "though diesels cast of meehanite metal were offered to the U. S. Navy for service aboard fighting ships, our Navy Department insisted upon welded steel." He cites British experiences with iron engines under the terrific force of new explosives the Germans were using, for the insistence upon welded steel. The fact is that the U. S. Navy, as a result of British experience with cast iron engines, insisted on *extending* the use of a type of construction which by sensible comparison under battle conditions proved more adequate.

Preceding the war, the Navy and engine builders including Lukenweld, had been working in close collaboration for many years on the development of engines utilizing welded frames.

Such construction had been applied extensively before the war, almost to the point of standardization for certain types of service.

Perhaps the Navy's insistence on the use of welded steel did create a production problem for L. F. Williams' company and perhaps for others; but with some builders it was no production problem. Through the years preceding the war, these engine builders had somehow survived, financially, the shock of the alleged high cost of weldments. In fact, they had practically standardized on them. Unless it is believed that they were philanthropic or soft-headed regarding weldments, their overall cost comparisons must have been satisfactory.

However, direct cost comparisons between cast and welded parts for such as those shown here virtually are impossible to determine for a very sound reason.

Having come to the conclusion that welded steel offered fundamental advantages, these builders discarded casting concepts when designing engines. Their engineers designed to utilize the properties of rolled steel plate. This is very different from the

concept of designing weldments simply to replace castings. Therefore, cast designs directly comparable to

the welded diesel parts illustrated here cannot be offered to show the evolution in the application of welded

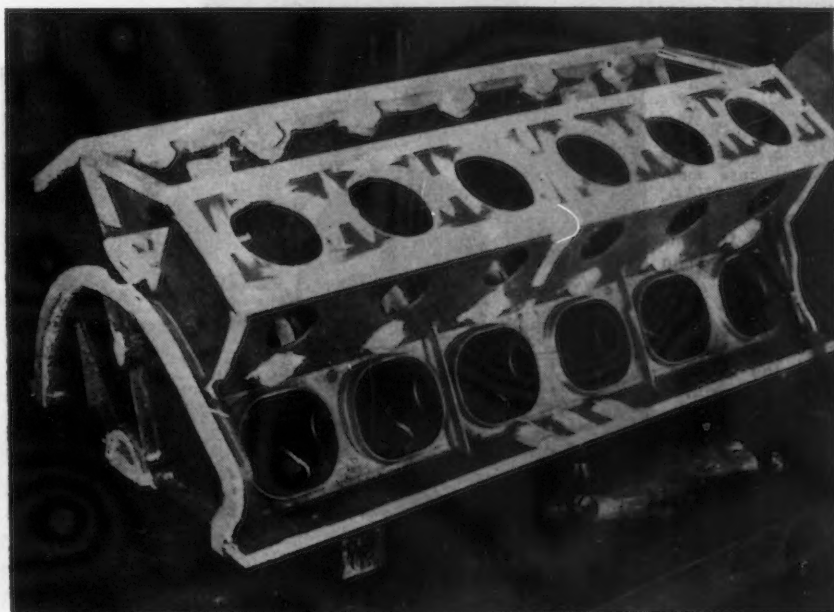


FIG. 3—Twelve-cylinder diesel crankcase, 6½ in. bore and 7½ in. stroke.

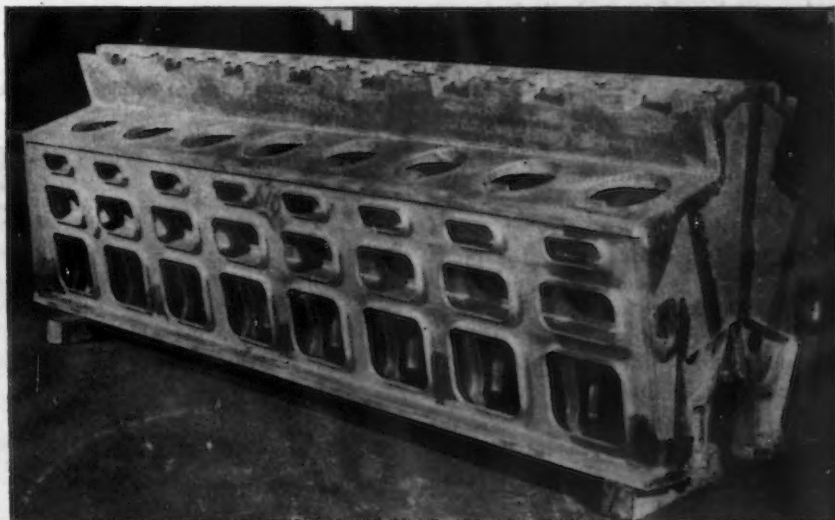
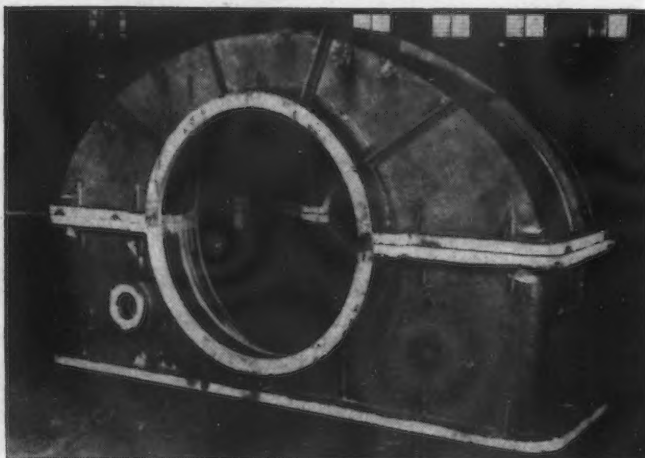


FIG. 4—Completed 16-cylinder diesel crankcase, fabricated of welded steel construction by Lukenweld, Inc.



FIG. 5—An engine, typical of a commercial line, using welded steel parts.

FIG. 6 — Turbine wheel case measuring 11 ft. 9½ in. long by 3 ft. 5 in. wide by 7 ft. 8 in. high and weighing approximately 14,950 lb. It was welded of ASTM A-89 and A-89 Grade A steel. This particular type case is used on cargo vessels.



construction to diesel developments, because castings for such designs have never existed.

Were cast iron to be substituted in any of the engine frames illustrated here, Figs. 1, 2, and 3, which represent a number of types built for several manufacturers, steel tension rods probably would be necessary. This would constitute a radical design change in the mechanical features of the engine. This would be necessary, since no room is provided in the engine as designed for weldments, for such mechanical additions.

This is simple evidence of the fact that in designing the engines covered here full advantage was taken of the properties of rolled steel plate. This resulted naturally in a lighter and more compact engine.

Some of the plate in these welded frames runs from 3/16 in. into much greater thicknesses. Can there be disagreement that this condition in castings of such size and complications is impossible or unsafe? Hence,

to redesign such frames for cast iron would require increased weight because of casting limitations alone.

If, in the future, engine builders using the weldments shown here find the expense too onerous to permit them to compete in their field, un-

doubtedly they will design engines to take advantage of the properties peculiar to iron castings or to suit their limitations. A direct cost comparison of parts still will be impossible and properly so.

One outstanding engine builder, in a recently published statement, wrote as follows:

"Two engineering improvements had a material bearing on the success of our engines. . . . The second of these was welded steel construction. . . . This improvement was made to eliminate breakage of sections which had occurred in the past and it also permitted weight reduction. It was demonstrated to be a most successful improvement."

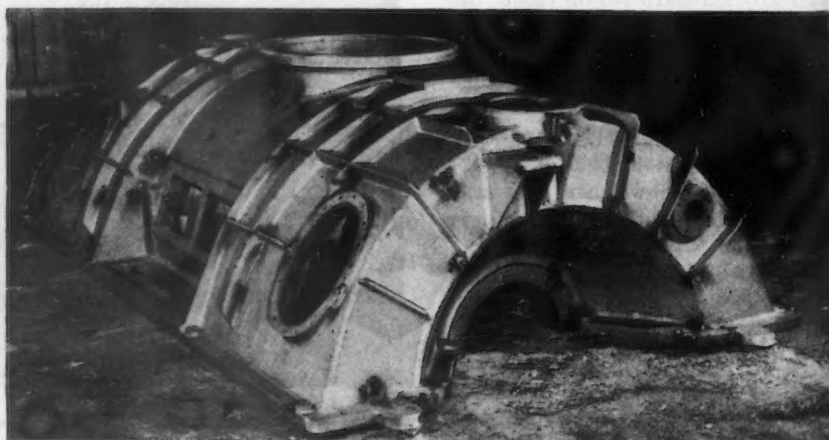
This engine builder does not operate a weldery or an iron foundry. He sees weldments as "improvements" to the engine, not as "cost hurdles." The cost of parts is not the only factor that counts. In an engineering consideration of the relative merits of materials or processes there are other important points, all of which add up to the question: "Will this material or process give more engineering freedom, providing a finished machine of greater efficiency?"

After this question has been answered with respect to a given application it is clearly a matter of weighing comparative costs of parts against the relative efficiency of the finished machine. If, finally, the more expensive parts, whether they be castings or weldments, are not justified on this basis; then obviously the Williams cost comparison does become of first importance.

It would be silly to pay a premium for a machine part if such payment did not contribute something that was worth the premium.

None of the manufacturers involved in building engines, types of which are illustrated, said to the designer

FIG. 7—Upper half of turbine case fabricated of formed and flame-cut plates. It measures 9 ft. 5 in. by 6 ft. 4 in. by 2 ft. 11 in. and weighs approximately 8500 lb.





and fabricator: "We cannot accept your design because we can get a casting for less money." The question apparently did not occur to them because they were not and are not basing the designs of their engine on getting cheaper parts.

They are basing them on getting better engines.

Reference is made also, in the May 18 article, to "numerous and ruinously expensive" failures of certain types of welded steel engine frames. In substantiation, the "findings" of an authority on British naval affairs are offered to the effect that "steel weldments while they do not shatter, usually are thrown so completely out of line that they cannot even be salvaged." Undoubtedly this is true in the experience of this authority. Under severe battle conditions and bombardments, what type of material or construction can withstand such

FIG. 10—Welded steel chemical dryer. This cylinder is 5 ft. outside diameter, has a 4 ft. face and weighs 4665 lb. It was designed to operate at 100 lb. steam pressure and is of the double shell type.

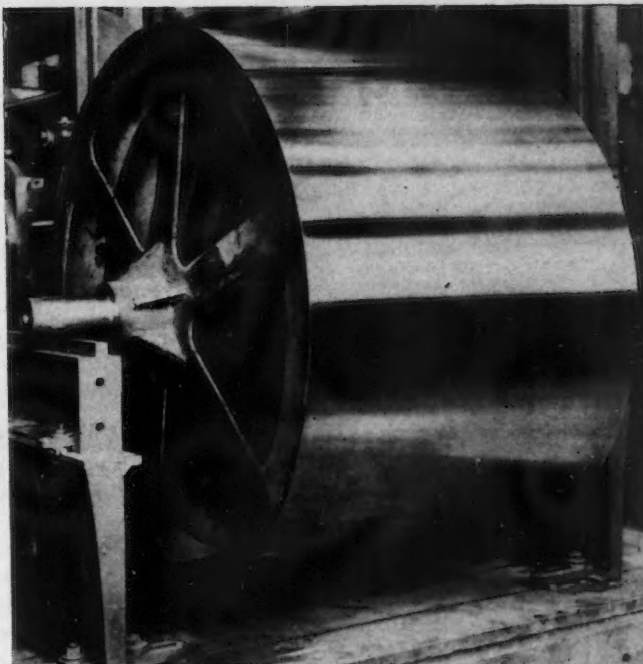
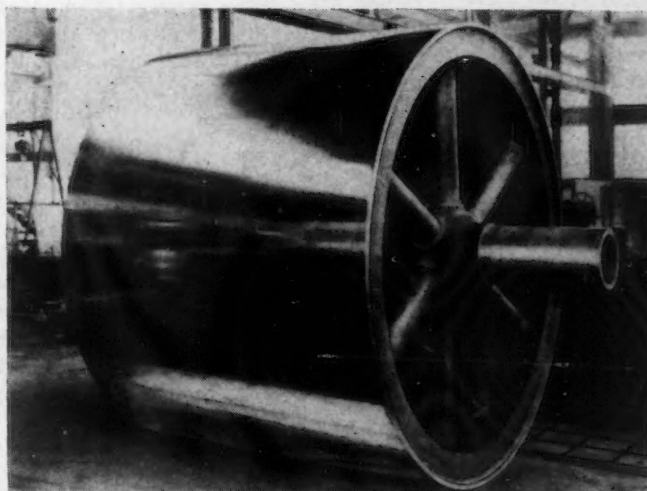


FIG. 9—A dryer roll measuring 8 ft. outside diameter by 10 ft. 10 in. overall length including the hubs with a 6 ft. 10 in. face, weighing 17,685 lb. The outside shell is 1 in. in thickness after being machined. The inside shell is  $\frac{5}{8}$  in.



such frames is shown in Fig. 4. Hundreds of these engine frames and others of similar designs are powering U. S. fighting vessels today, and in no instances known to the manufacturer have these frames when bombed or mined failed to the point of being unsalvageable by being thrown completely out of line. A few have failed in service, but the number of failures have been far below normal expectancy. None has been scrapped during fabrication.

In a surprisingly few known instances fractures have occurred following a series of bombings. These have been repaired without removing the engine from the vessel.

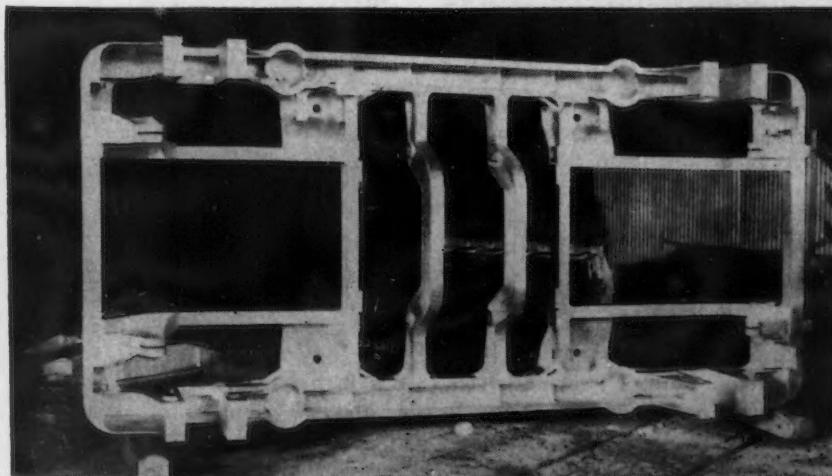
In one notable instance, fractures were found in an engine frame in one of the most honorably battle-scarred of U. S. submarines, thousands of miles from its home base. It is said that it had gone through three bombings and two depth charge attacks, in one of which 56 depth charges were thrown at it. Despite these encounters, the engine still was in mechanical operating condition. However, after subsequent inspection, Navy men and the fabricators decided that replacement of the frame was necessary as a measure of safety. The inspection revealed more than 100 fractures. None, however, had occurred in the primary stress areas, those sections subjected to meticulous design from the standpoint of predictability. And in addition to this unusual battle service, this engine previously had undergone many thousands of hours of normal service.

Experiences such as this—some day  
(CONTINUED ON PAGE 168)

treatment to a degree of perfection? Hence, it becomes a matter of *relative* resistance to such operating conditions.

There are ten thousand or more welded steel diesel frames which have made enviable records of service for many years. A typical example of

FIG. 8—Application of a weldment in "heavy" machinery, a railcar truck frame.

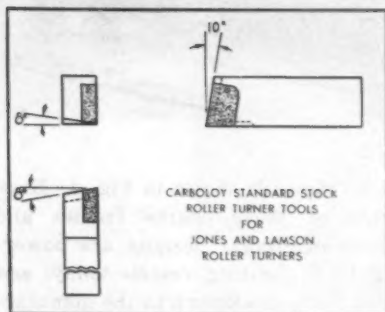


# New Equipment . . .

## Small Tools

. . . Recent developments in cutters, drill grinding attachments, fasteners, gages and other measuring devices are included in the following pages.

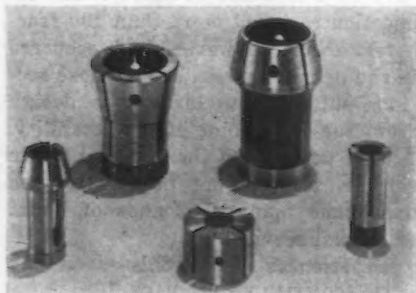
A SERIES of Carboloy cemented carbide tipped tools designed for Jones & Lamson roller turners has been announced by *Carboloy Co., Inc.*,



Detroit 32. The tools range in size from  $\frac{3}{8} \times \frac{1}{2}$  in. shank size to  $1 \times 1\frac{1}{4}$  in. shank. The company also announces that roller turner tools for W & S and Gisholt lathes have been reduced in price as a result of improved design and lower cost volume manufacturing. The various tools are designed for J & L roller turners No. TX536, 537, 805, 813, 865, 873, 875, 876 and 1013.

### Collets and Collet Pads

COLLETS and collet pads have been added to its line of holding and indexing fixtures by *Zagar Tool Co.*, 23880 Lakeland Blvd., Cleveland 17. The collets are available in No. 5-C draw type and No. 2 W. & S. type as well as No. 6 W. & S. type. Both types of collets and pads for master collets can be furnished in rounds, hexes or squares. The No. 5-C draw collets have ground threads to insure accuracy.



### Band Saw Blade

A BUTTRESS saw blade designed for cutting ferrous and non-ferrous alloys and also non-metallic materials has been announced by the *DoALL Co.*, 254 North Laurel Avenue, Des Plaines, Ill. An innovation in the design of the teeth is said to permit rapid production, parallelism and close tolerance over the entire finished cut. Tooth gullets are elongated to provide plenty of room for removal of chips to assure cool continuous cutting. The teeth are securely anchored to withstand shock



and made fast in their precision set position by means of accurately controlled heat treatment. To impart abrasive resistance into the sharp cutting edge of the teeth, high carbon steel is used. The saw is manufactured in widths from  $\frac{1}{4}$  to 1 in., having various sets and pitches.

### Carbide Turning Tools

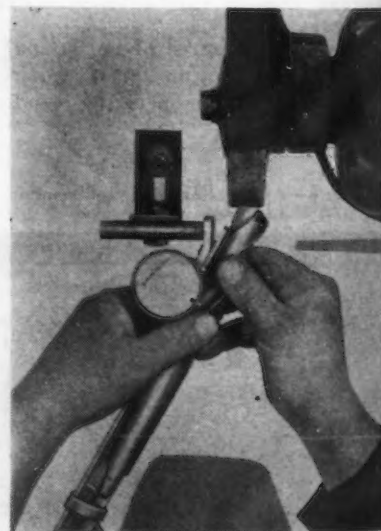
A  $\frac{1}{4}$  in. size tool has been added to its line of Style 4 and 7 right and left hand standard turning tools by *Carboloy Co., Inc.* The new standards are available from stock in Grade 78 for steel cutting, and in



Grade 883 for all other materials having a  $\frac{1}{4}$  in. shank  $1\frac{1}{2}$  in. long. The tools are regularly packaged for shipment from stock in quantities of 12 although they are also available in other quantities.

### Drill Sharpener

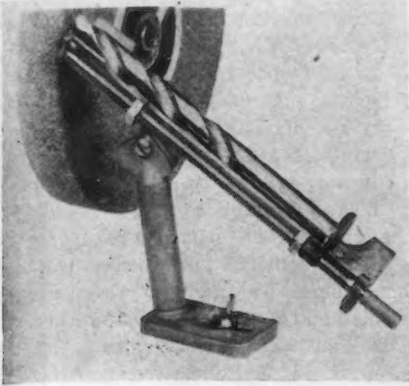
A DRILL sharpener with dial adjustment has been announced by *Ameraco Industrial Specialties*, 122 S. Michigan Avenue, Chicago 3. Designed to fit any grinder, the drill sharpener is easily adjusted for sharpening straight or No. 2 taper shank drills. The drills are positioned in a bracket-supported trough so that their ends move in a guided path against the wheel of the grinder. Cutting edges are uniform with angles the same on both sides.



### Drill Sharpener

FOR the sharpening of twist drills, a simple tool, the Super, has been announced by *A. D. McBurney*, 939 West Sixth Street, Los Angeles 14.

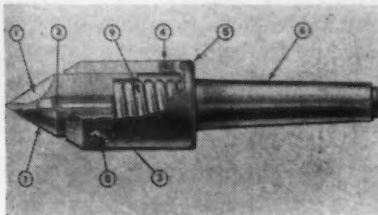




It handles drills from 3/32 to 1-1/16 in. in diameter and up to 11 in. in length. It is adjustable to either 59, 69 or 88 deg. angles.

#### Lathe Center

DESIGNED for pressure machines and work which must be held within tenths of thousandths, the New Era lathe center has been announced by *Cesco Products* for the *Diamond R Agencies*, Pasadena 17, Cal. The lathe center is said to hold limits indefinitely for high speed machining. It is especially applicable to the use of carbide cutting tools. The heavy helical spring provides for maximum length of machining with minimum wear on the center point.



#### Drill Press Turret Head

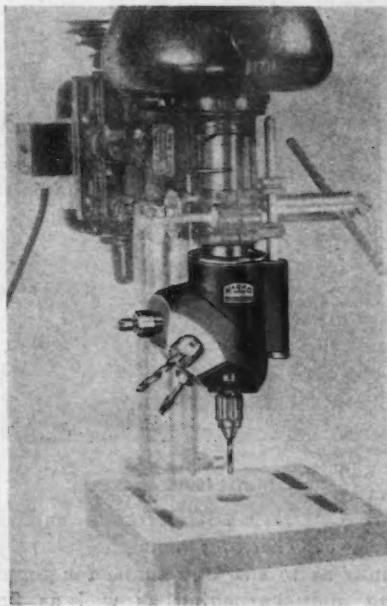
A MULTIPLE tool holder for drill presses has been announced by *Universal Engineering Co.*, 2230 National Avenue, San Diego 2, Cal. The three position turret clamps on the quill of any standard drill press and gives the operator immediate choice of three different sized drills or other tools. All parts are interchangeable. Capacity is 1/4 in. drill size and Jacobs 1/4 in. capacity chucks are furnished



as standard equipment. The turret is constructed to provide sufficient clearance for most types of jigs and fixtures and is easily shifted from one position to the other by a light movement of the indexing lever. Positive indexing locations are provided.

#### Drill Turret Attachment

A TURRET attachment for small type drill presses has been announced by the *Machine Development Co.*, 516 Fifth Avenue, New York 18. Designed to enable single spindle drill presses to be used for multiple spindle operations, the attachment called the *Madco turret head*, carries six indi-

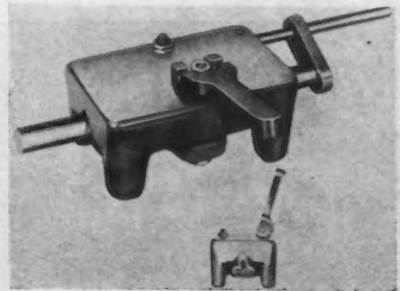


vidual spindles and will take up to 3/8 in. diameter drills. It can also be used for tapping when a drill press is equipped with a reversible motor. By means of a clutch arrangement, the individual spindles are driven in perfect alinement with the main drill press spindle. To operate, the drill press lever is raised, the hand turned to any station desired and the lever lowered as in a normal drilling operation. A ball and detent arrangement indicates when the head is indexed to the correct position and the special clutch device automatically engages and alines the spindle for drilling.

#### Thread Cutting Chart

A QUICK reference chart for engine lathe thread cutting has been announced by *Burton Hazleton Specialties*, 312 East Bodley, Kirkwood 22, Mo. A compound rest diagram shows the angle to set compound rest on the lathe cross slide. A thread form diagram shows position of cutting tool touching the work. Pro-

gressive steps of the tool feed are indicated. Reverse side of the chart selects a National coarse or National fine machine screw and shows the threads per inch, the tap drill size and the body drill size for a machine screw.

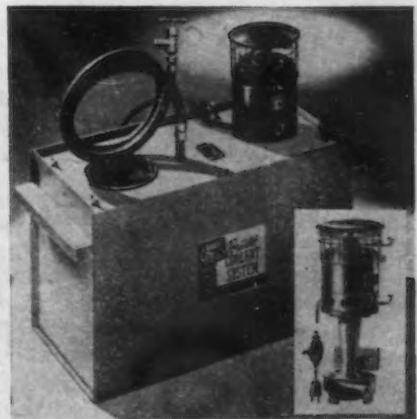


#### Drill Jig

ADJUSTABLE for holding many sizes of small work, a *Parlec* drill jig for round stock has been announced by *Universal Tool Co.*, 919 East Redondo Boulevard, Inglewood, Cal. Known as Model R, the jig comes in three sizes to handle work from 1/4 to 2 in. in diameter. Where the piece to be drilled is shorter than the jig body length, a stop is added by installing pin in the jig body where required. If a stop longer than the one furnished with the jig is required, a standard diameter bar stock may be used to obtain the necessary length.

#### Centrifugal Coolant System

A CENTRIFUGAL coolant system, Model 1130, suitable for application of coolants to grinders, cut-off saws, milling machine and such operations as fine abrasive cutting and honing has been announced by *Gray-Mills Co.*, 1948 Ridge Avenue, Evanston, Ill. Flow is adjustable from a trickle to a full stream. Powered by 1/15 hp. motor with sealed bearings, the new system has a *Gray-Mills* Model 1100 centrifugal pump with a capacity rated at 1200 g.p.h. (water at 0 head or 360 g.p.h. at 5 ft. head).



The unit is portable and ready for plug in operation. Forced-settling baffle plates are built into the tanks to reduce circulation of solids. The Model 1100 pump is designed for built-in coolant systems or as a general purpose pump for sumps.

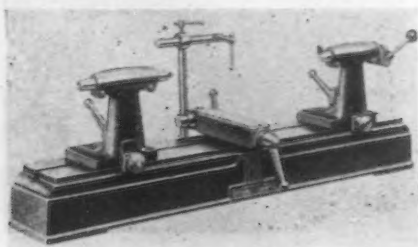


#### Spark Plug and Thermometer Bulb Inserts

AS additions to the Rosan locking system, *Bardwell & McAlister, Inc.*, Hollywood, have announced a spark plug insert and a thermometer bulb insert. The bulb insert for use in tank and plumbing installations is made of steel and inserted in soft metals which prevents the usual crossing of the threads in the soft material of the thermometer bulb receptacle. If the insert is damaged, it can be replaced in such installations without removing plumbing or the tanks. The spark plug insert, an aluminum bronze threaded insert, can be locked in an aluminum alloy engine head so that in the event of a thread being crossed when installing or removing spark plugs, the Rosan units can be replaced without disturbing the material of the engine head itself. Coefficients of expansion for the aluminum bronze of the insert and the aluminum alloy of the engine head are so close in value that there is no disturbance between the two metals when heated.

#### Bench Center

TO meet the need for accurate and easily operated inspection and testing devices, *Delta Mfg. Co.*, 620 E. Vienna Avenue, Milwaukee, has



developed a Delta-Milwaukee bench center. A special feature is the indicator support bracket which has a base that can be quickly locked in any position on the bed by merely operating a handle at the front. The part that holds the indicator can be placed in any position—vertical or horizontal. Large, convenient clamp handles are provided. Other features include a bed made of heavy casting and fully normalized to relieve strain, a flat top surface and reversible head and tailstocks that can be operated from either side. The stocks contain hardened and ground 60 deg. angle centers for holding the piece to be inspected. Maximum distance between centers is 19½ in.

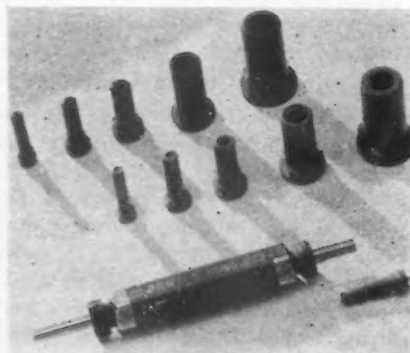


#### Countersink Gage

A COUNTERSINK gage capable of checking machine countersinks as to size and shape for grinding and sharpening as well as finished countersunk screw adaptors has been announced by *Dayton Rogers Mfg. Co.*, 2835 12th Avenue South, Minneapolis 7. Five different countersink angles are included, including two gage view profiles. The gages are used as standard for grinding the machine countersinks and checking the finished work.

#### Plastic Gage Collets

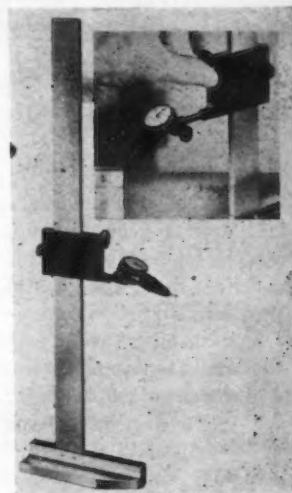
BLACK and red collets of Tenite plastic, tapered and slotted to fit standard plug gage handles are



being marketed by *Turner Gauge Grinding Co.*, Ferndale, Mich. The use of Tenite for these collets is said to prevent scratching or burring of the gaging surfaces. When the "go" and "not go" ends are worn beyond allowed tolerances, they can be cut off and an unused end is ready for gaging. Red collets are made for quick identification of the "not go" members. To facilitate resetting, the shoulder of the collet is notched for an end wrench and a thin slot the length of the collet takes up slack in the locked position. Two shallow flat surfaces on the taper provide for dimensional adjustment under pressure. Tenite is a product of *Tennessee Eastman Corp.*, Kingsport, Tenn.

#### Height Gage

A FINE adjustment height gage, Model 1492, which incorporates a fine adjustment bracket and a testmaster has been announced by *Federal Products Corp.*, 1144 Eddy Street, Providence. Features of the gage include a fine adjustment screw which raises and lowers the Testmaster indicator point a distance equal to the full range of the indicator or 0.030 in., dovetail slides and universal clamp which enable setting at any point, and a chrome plated swivel point. The Testmaster indicator can be set at any angle, down in a hole, sidewise or close up to the bracket.



#### Blind Fasteners

A BLIND fastener, the Rivnut, which serves as a nut-plate, rivet or both is now being made of brass as well as aluminum according to an announcement by *B. F. Goodrich Co.*, Akron, Ohio. It is claimed that tensile and shear strength of the fasteners made with the brass alloy is about 50 per cent greater than those made from aluminum.





Jones & Lamson Optical Comparator being used to inspect the thread of a vital airplane part.

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# Assembly Line . . . STANLEY H. BRAMS

• CIO-UAW convention was at least as loud, unexpected, ultra-democratic, pyrotechnic, revealing, primitive and gusty as its predecessors.



**G**RAND RAPIDS, MICH.—To describe a convention of the CIO United Automobile Workers Union as unusual would be as inadequate as saying only that a Rembrandt is colorful. The ninth annual meeting of the UAW, completed here Sunday night after seven hectic days, was at least as loud, unexpected, ultra-democratic, pyrotechnic, revealing, primitive and gusty as its exciting predecessors.

Automobile industrialists who think of the UAW as a nebulous something in their shops whose primary substance is a bargaining committee and whose primary manifestation is a strike, might do well to ruminate over the complete report of this convention. Better still, if it were practical, they might attend. Certainly they would be rewarded with a new concept of the strength of the movement which swept across their shops during the last decade.

The UAW is ultimately a human organism. It may be as unwelcome as a weed, but it is certainly as persistent and perennial. That is because it is made up of men and women whose passion for their union is as gripping and positive as the horse player's determination to get a bet down on the Kentucky Derby. This fixation, unlike Napoleon's old guard, will neither die nor surrender. It could no more be legislated out of existence or into impotence than could Europe's underground.

At Grand Rapids were the leaders of the UAW. The rank-and-file back home are not individually as articulate, almost certainly not as enthusi-

astic. But they are a force to be reckoned with. The same delegates who had no hesitancy about booing CIO President Philip Murray or their own president, R. J. Thomas, who adopt Westbrook Pegler's language in contemptuously referring to their own hired organizers as "pork choppers," who catcall when they are angry and are not hesitant about backing up their voices with their fists if needs be—those same delegates, when they faced the question of taking final action on the bitterly argued no-strike pledge question, had no stomach to do so. Although they had voted to uphold the pledge by a rough 60-40 margin (see table of major local votes), they favored better than two-to-one the running of a necessarily expensive referendum on the issue among the membership. This action aptly indicated the menacing power of the back-home members; one hard boiled delegate told the story in two sentences: "You think I'm going on record as not giving the boys back home a chance to vote on this? You think I'm crazy?"

The bitterness of the fight over the no-strike pledge was an obvious seed of future and larger labor trouble. The 30 delegates from Briggs Local 212, leaders in the fight for outright rescindment of the pledge, cast their 164 votes in a solid block for repeal. So did a broad scattering of delegates from General Motors plants—most of those in Flint, Buick-Melrose Park,

Chevrolet Gear & Axle in Detroit, Oldsmobile. So did a great number of smaller locals largely situated in plants which are now beginning to go through the throes of cutbacks and which, therefore, are now more vulnerable to labor uneasiness.

Up to now, the international board has been able to use the no-strike pledge, even submerged as it often was under the weight of localized action, as a means of getting the men back to work. Now, however, the union has split itself on the issue. The split will not affect future internal union affairs beyond the strike sphere, but it will certainly emasculate any efforts of the international board to crack down on locals whose members insist on following their own untrammelled policy path on walk-outs. An organization with more than 40 per cent of its membership dissenting on a basic and explosive issue can hardly hope to maintain control from the top in rebellious lower level sectors—certainly not, at least, in the direct actionist United Auto Workers.

Meanwhile, preparations are starting for the referendum of the 1,100,000-odd auto unionists, pending which the no-strike pledge is to be upheld, in principle if not in fact. The vote will begin in December, about 90 days from convention adjournment, there being two reasons for this:

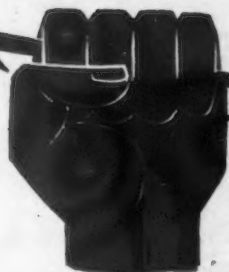
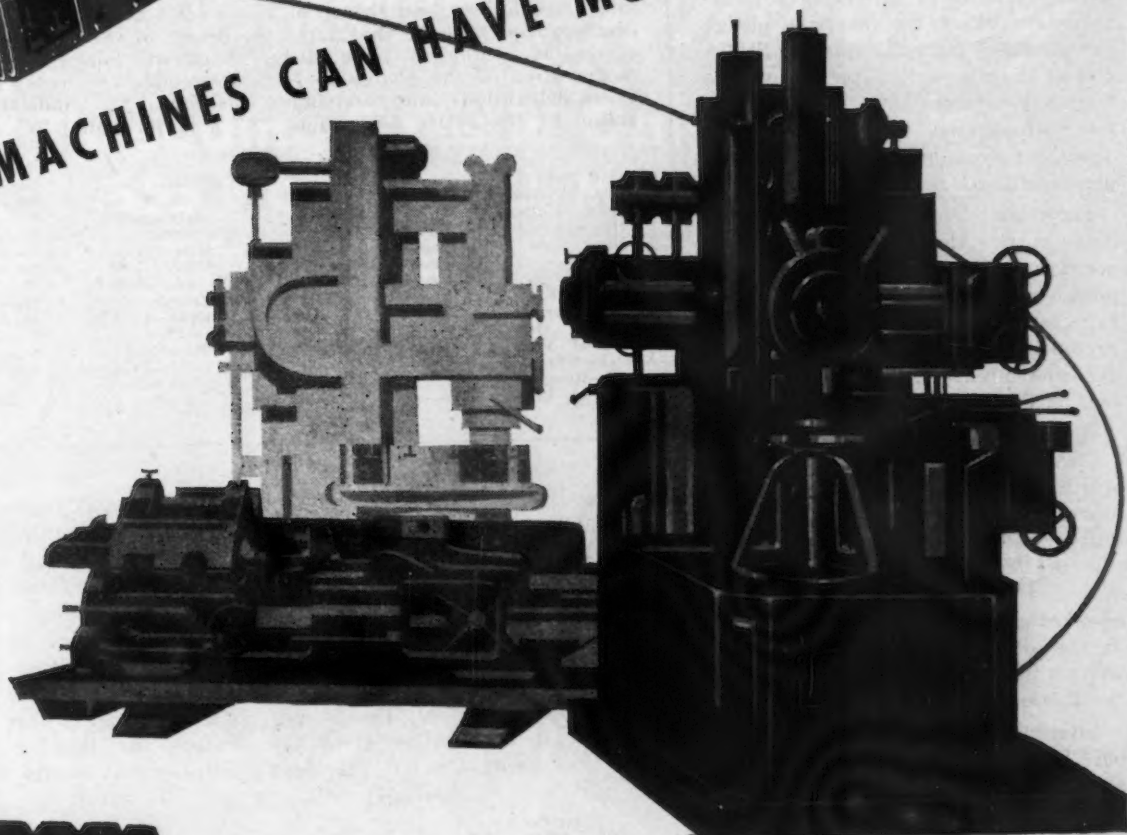
Basically, the delay becomes a bargaining weapon for the UAW to take to Washington in support of demands

FLAME THROWER: A "Wasp" flame thrower goes into offensive operation somewhere in France. It was only recently revealed that flame throwers were used by the British Army during the invasion. The "Wasp" is fitted to a carrier with a bullet-proof body.





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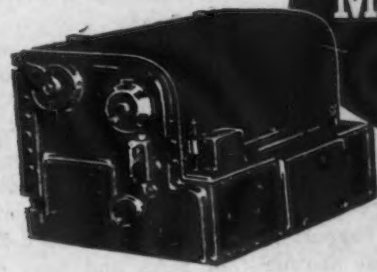
The Bullard "MAN-AU-TROL" principle of automaticity transfers to a simple automatic control, man's ability to think and act for himself . . . and with an accuracy and consistency far beyond any man's ability.

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for logical, speedy and (for labor) advantageous reconversion. The auto union officials will point out to Washington that if the reconversion can be arranged in form satisfying to individuals workers, the no-strike pledge can probably be maintained until the end of the war with Japan as well as Germany, without even the qualification which the convention roared down, of exempting civilian goods plants after Germany's fall.

Secondarily, of course, the 90-day delay carries the decision of the referendum beyond election. If the pledge were to be rescinded, it can be expected to impair organized labor's presently shaky position in the public eye, and might well have modest effect on the election. Delay loses nothing, and is good insurance.

Current political aspects shaded the entire convention proceedings. Philip Murray's call for harmony within the union was predicated on the effect on the presidential race. Sidney Hillman appeared to appeal for PAC funds. Speaker after speaker, arguing one or another of the matters before the convention, touched on its relationship to the Roosevelt campaign.

Internal politics, too, played a big part in the convention. Its most notable aspect was the drive to oust Walter Reuther as a vice-president—a drive that failed when Reuther mustered surprising strength to beat down the challenge of his one-time backer, Richard Leonard, national Ford director, by a two-to-one margin.

Leonard, dissatisfied with inability of the Reuther wing of the UAW to elect him to the other vice-presidency or the secretaryship last year, determined in August to cast out on his own. He revealed he would run on the first vice-presidential ballot against both Reuther and Richard T. Frankenstein. The ensuing split in Reuther strength naturally would give Frankenstein a re-election victory.

Then, on the ballot for the other vice-presidency, Leonard would oppose Reuther. He expected that the votes he drew from the Reuther side, plus the support of the faction of Frankenstein and secretary George F. Addes, would elect him.

A dramatic election eve caucus of the Reutherites saw the issue hardened. Behind closed doors Reuther pleaded with Leonard to withdraw, then suggested that both run on the first ballot against Frankenstein, with the one obtaining the lesser number of votes to get out of the race. Leonard stood firm; some of his supporters said he had to do so because another

## How They Voted on Strikes

• • • Below is tabulated the vote of the larger UAW locals on the two strike resolutions brought up at last week's convention. Some apparent discrepancies indicate that after the defeat of the first vote, calling for rescinding of the no-strike pledge, dissidents joined with adherents of modification of the pledge to force a second "no" vote; in some other cases delegations simply changed positions. "U" indicates unanimous action by the entire delegation; "S" a major split; "s" a minor split.

	To Rescind	To Uphold		To Rescind	To Uphold
Dodge Main	No—s	No—s	Pressed Steel	No—U	Yes—U
Stude.—S. Bend	No—U	No—S	P & W Air	Yes—s	No—s
Bendix—S. Bend	No—s	Yes—s	Maintenance	No—S	No—s
Willys-Overland	No—s	No—s	Foundry	No—U	Yes—U
Willow Run	Yes—s	No—s	Motor Bldg.	Yes—S	No—S
Hudson	Yes—s	No—U	Others	No—s	Yes—s
Packard	No—s	Yes—S	N. Am.—Grand		
Six Briggs plants	Yes—U	No—U	Prairie	No—U	Yes—U
Briggs Aero	Yes—S	No—S	Wright—Lockland	No—U	Yes—U
Brewster Air	Yes—s	No—s	AC—Flint	Yes—U	No—U
Ford—H. Park	Yes—s	No—s	Chev.—Flint	Yes—s	No—U
Buick—Flint	Yes—U	No—U	Wright—Paterson	Yes—U	Yes—U
Ford—Rouge			Curtiss-W.—		
Tool & Die	No—U	Yes—S	Columbus	No—U	Yes—U

withdrawal on top of others of the past would leave his followers forever skeptical of him. When Leonard left the meeting he had broken once and for all with the Reuther people.

The Addes-Frankenstein faction, meanwhile, did not appear to be moving with the fullest steam to get behind the Leonard drive. That might have been, it was whispered at the convention, because CIO president

Philip Murray was worried over a schism which might follow a Reuther defeat, and insisted to the top UAW officers that no change occur in the central administration of the union. At any rate, when the second race for a vice-presidency began, key votes usually in the Frankenstein-Addes column began to turn to Reuther, and before the tallying was half over Reuther was a sure victor.

## Gray Iron Foundry Advisory Member Reports on Minor Defects

### Washington

• • • Minor defects that could be corrected by welding and not affect the efficiency of cylinder blocks and cylinder heads have caused rejections of gray iron automotive castings and have cost the Armed forces many units that might now be in active service, a member of the Gray Iron Foundry Industry Advisory Committee said at a WPB meeting last week. He contended that welding of partially defective castings would make them entirely satisfactory, but that salvaging of castings should be effected by experienced personnel and proper facilities.

Committee members reported that tentative specifications of salvage procedure are being submitted to the armed services for approval. These specifications were prepared by a special group of automotive castings producers and submitted to the War Engineering Board of the SAE. Lack of block and head castings, a WPB

official reported, still is delaying engine production.

The Committee recommended that voluntary reports of monthly production and shipments of gray iron castings be submitted by the industry to the Bureau of the Census even after hostilities.

A committee member made a favorable report on the use of loudspeaker sound equipment in his plant and said that broadcasting of news bulletins and music to the day and the night shifts improve morale and increase production. He added that natural lighting through glass ceilings also improve and increase production and reduce worker fatigue and lighting costs.

Discussing the labor situation, WPB officials said that 16,000 natives of the British West Indies, who have been working on farms in the United States, may be available soon for foundry work.

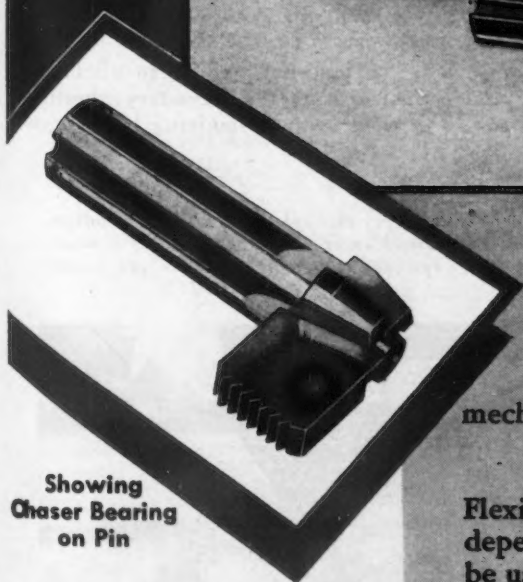


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# Washington .

L. W. MOFFETT

• Expect three periods of readjustment and unemployment within the next two years . . . Efforts will be made to achieve "full economy" by government spending.



**W**ASHINGTON — While doubt and confidence see-saw over the immediate probable results of freeing 40 to 60 per cent of industry from wartime controls, the long range results of the ending of all government contracts are not so difficult to predict.

The way things look now, there will be three periods of readjustment and unemployment within two years, if the Japanese war lasts that long. The first period will come right after the German capitulation when the first cutbacks are made and the second will come within 90 days when cutbacks are intensified. The third period will come after Japan loses.

Should the Japanese war terminate by the spring of next year, then there will be a telescoping of the periods, with results which cannot be compared with those anticipated in the event of a prolonged Pacific war.

The long and pessimistic view is that the overexpansion of manufacturing facilities and overdevelopment of natural resources will retard industrial construction and the search for new resources for at least two decades.

Unless the United States is communized, it is argued, there will be unemployment and depression because the labor force has been expanded, and there is little hope that a normal, free economy can in the future consume all industry can produce.

The truth and obviousness of these conclusions, it is maintained, was

borne out by the contraction of business after the boom succeeding World War I. The slowing up and depression will come after more important consumer demands are satisfied.

\* \* \*

Efforts will be made to achieve "full economy" by government spending on public works and by conducting the foreign trade of the nation on the lines of existing cartels.

Most commercial experts think that it will not make any difference in the conduct of foreign trade by governments if Mr. Dewey wins in November.

If there is no successful attempt to collectivize the United States, and it is hoped that a relatively free competitive capitalism can be maintained, then unemployment compensation, other kinds of direct relief, and made work are in the cards.

\* \* \*

Those who are moderately gloomy about the speed of reconversion think that the slack of unemployment can be taken up in the first six months after Germany is defeated. The very gloomy think that a serious depression is going to result which will not be dispelled until after the defeat of Japan.

There is talk about a drop of \$10,000,000,000 to \$40,000,000,000 in con-

sumer buying power because people will have to use savings to maintain themselves while industry takes a year to readjust. Unemployment estimates for the first year after Germany drops vary from 3,000,000 to 8,000,000 out of work from one day to a year.

The wildest speculation about every feature of the change-over to civilian production is being indulged in by Commerce Department and WPB officials. There are a dozen answers to every question.

However, the consensus is that favorable answers to the following questions will remove the doubts that industry can soon get back on its feet.

1. Will contract cancellations be made in such a fashion to permit major industries such as the automobile industry to reconvert with comparative ease?

To accomplish this, the Army must cut deeply enough to free the capacity of subcontractors and suppliers sufficiently to enable them to furnish the products needed of the type and quantity desired.

2. Will the skilled labor needed be available?

The tendency will be to discharge women first; the secondary question of whether the remaining labor force

**AIRBORNE TANK:** A new airborne tank drives through a mock German village at Army Service Forces Ordnance Training Center, Aberdeen Proving Ground, Md. The tank weighs 7½ tons and is designed to be carried by air and landed behind the enemy lines.



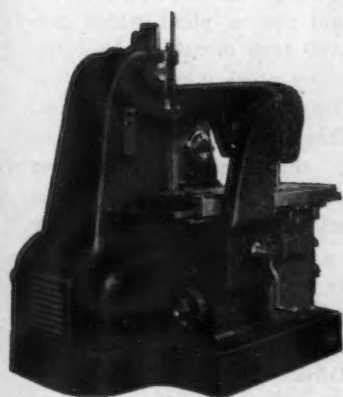


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In addition to automatic table feed cycles, the CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine offers this important advantage: *down feed of the cutter head, synchronized with the table feed cycle.* This extra feature is especially useful where there is an obstruction between milled surfaces such as the bulge in the crankcase casting between the two milled pads, as shown in the illustration below. Special equipment to handle this job included: fixture, cap type arbor support to fit over extended shell end mill, and special cycle selector to mill down in two accurately located positions of table. ¶ This setup was developed by the CINCINNATI Application Engineers who will be glad to discuss your milling problems with you in an endeavor to work out a more accurate or more economical way of handling them.

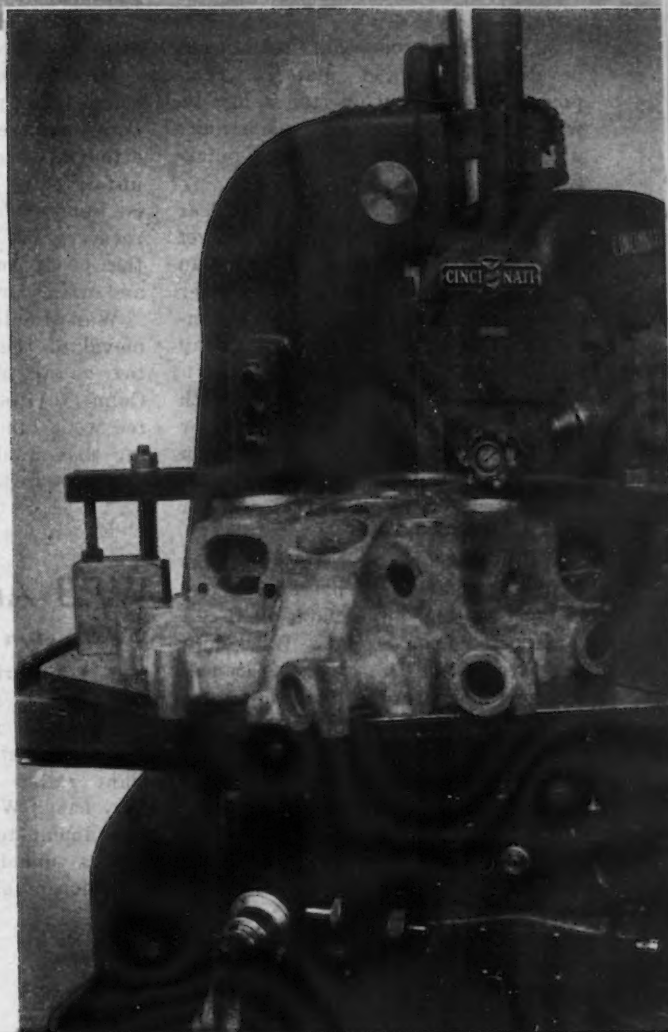
Above Right: Milling two pads on rear crankcase for aircraft engine. The machine is a CINCINNATI No. 2-24 Automatic Rise and Fall Miller. After loading the fixture, the operator merely flips the starting lever and nine functions of the milling cycle follow automatically, including return of the table to the starting position.



Illustrated at the right is a close-up of part being milled on the equipment shown in the photograph above. Also shown is a diagram of the automatic cycle.



Above: CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine. Catalog M-909-1, giving complete specifications, is yours for the asking. For a brief description of all CINCINNATI Milling Machines, look in Sweet's Catalog File for Mechanical Industries.



Here are the nine automatic steps in the cycle:

## START CYCLE

- 1 Table rapid advances and cutter starts.
- 2 Table feeds to accurate cutting position.
- 3 Table stops. Cutter head rapid advances down, trips to feed rate and mills pads.
- 4 Cutter head rapid returns to top of stroke.
- 5 Table rapid advances to next cutting position.
- 6 Table feeds to accurate cutting position.
- 7 Table stops. Cutter head rapid advances down, trips to feed rate and mills pad.
- 8 Cutter head rapid return to top of stroke.
- 9 Table rapid returns to starting position and cutter stops.

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has the requisite skills depends upon the speed of demobilization of the Army.

3. Where production bottlenecks develop because of material component or machine shortages locally, will companies be able to redistribute usable termination inventories quickly among themselves?

A great many officials of WPB fear that the War Department may yet try to depart from its agreed plan to cut 40 per cent two weeks after X-Day in an attempt to prevent unemployment before elections, if X-Day comes before election day.

More apprehension is felt that with part of the economy free and another part controlled that the competition between the military and civilian industries will result in confusion and a slow-down of reconversion.

WPB has promised to help, but the surplus property procedures are so poor that no appreciable help can be expected from SWPA. WPB may need legislation to give assistance, but now promises to "use the telephone," dish out civilian priorities in emergency cases and if necessary reinstitute controls to ration industrial products falling in shortage or poor distribution categories.

Without any sign of proper inventory methods, the SWPA stands as a

failure. Redistribution of industrial products will fail unless business takes care of these surpluses on its own initiative.

Unless the government adopts a sound labor policy which will protect both management and labor, union attempts to consolidate and preserve unfair gains awarded by WLB promise industrial strife which will retard recovery. If wages are set too high, the profit incentive may disappear and with it risk capital.

War Mobilizer Byrnes proposed removal of the wartime excess profits tax as an aid to business, but the Colmer (House) Postwar Committee went him one better by suggesting that middle income and lower income group taxes be reduced as well.

The committee would also establish as a standing tax policy the carry-back feature of the last few revenue acts.

Any administration courting a consumer boom will have to make realistic tax reductions, maybe as much as 50 per cent as Senator Walter George, democrat of Georgia, has proposed.

The crippled conversion policy on wages and prices may lead to troublesome squawks from organized labor and management, too. It is altogether possible for one firm to have two wage and price scales in the readjustment period which may lead to a great deal of confusion and charges of unfair competitive advantages, depending upon how cutbacks are made.

## WPB Amends Direction 4 of M-21-a

### Washington

• • • Covering material containing 0.30 per cent or more nickel and 0.08 per cent or more molybdenum, and based on monthly use on an individual plant rather than an overall company basis, WPB last week issued an amendment to Direction 4 of Order M-21-a mandatorily increased consumption of alloy steel scrap in elec-

tric and open hearth furnaces. Electric furnace charges of alloy scrap were increased from 60 per cent to 65 per cent and open hearth charges were increased from 50 per cent to 52 per cent. The turnings to be included in the electric furnace melts remain at 8 per cent of the monthly total and the required turnings consumption in the open hearth furnaces was extended from 8 to 11 per cent.

The requirement for using definite percentages of alloy scrap in the manufacture of chromium steels has been eliminated, they explained. Stainless steels, tungsten tool steels and high alloy heat-resisting valve steels used in internal combustion engines are still excluded from the direction.

WPB officials in offering an example, said that a plant which produces 10,000 tons monthly of electric furnace alloy steel ingots must consume at least 6500 tons of alloy steel scrap. This scrap must be added directly to the furnace charge, or through the use of pig iron. Of the alloy steel scrap consumed monthly by such a plant, at least 800 tons must have been in the form of alloy steel turnings.

The steel industry has recommended that Direction 4 be kept in force in order to conserve alloys and to reduce the contamination in carbon steel, WPB officials pointed out. It was added that if mandatory segregation of alloy scrap were eliminated, or if the consumption of this segregated material should be reduced, the contamination problem would be considerably increased.

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- PRESS WORK ON METAL . . .

● and                       
TO "WEAR PROOF" THE  
PRODUCTS YOU SELL

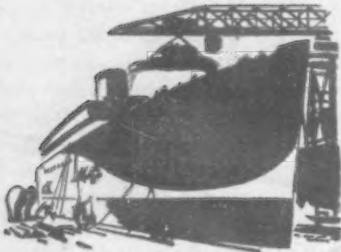
# CARBOLOY

TRADE MARK



TUNGSTEN CARBIDES \* \* \* TUNGSTEN CARBIDES WITH TANTALUM AND/OR TITANIUM CARBIDES

• "Right to work" proposed amendment to state constitution submits fundamental conflict in industrial relations within California to misunderstanding and war - prejudiced vote in November.



**L**OS ANGELES—On Nov. 7, when voters in most of the other 47 states will be principally deciding between a Fourth Term and a new horse, under political party pressures, it is likely that voters in California will be bitterly concerned over the following initiative measure, a proposed amendment to the State Constitution which will be referred to between now and then as "No. 12" and the "Right to Work":

"Article I, Section 1A. Every person has the right to work, and to seek, obtain and hold employment, without interference with or impairment or abridgment of said right because he does or does not belong to or pay money to a labor organization.

"Anything done or threatened to be done which interferes with, impairs or abridges, or which is intended to interfere with, impair or abridge said right, is unlawful. Relief against or on account of anything so done or threatened to be done shall be granted in a civil action, legal or equitable, initiated in the Superior Court of any County in which anything so done or threatened to be done shall occur, upon the complaint of any person or upon complaint of the District Attorney of such County.

"The term 'labor organization' means any organization of any

kind, or any agency or employee representation, committee or plan, which exists for the purpose, in whole or in part, of dealing with employers concerning grievances, labor disputes, rates of pay, hours of employment, or conditions of work.

"This section is self executing and shall supersede all provisions in conflict therewith; legislation may be enacted to facilitate its operation but no law shall limit or restrict the provisions hereof."

This controversial measure won its place on the ballot June 29 after 180,449 registered voters, from 80 to 90 per cent of them in Los Angeles County, signed petitions. If carried, which seems more than likely, it will legalize and specify for California an open shop condition in all labor and industrial relations.

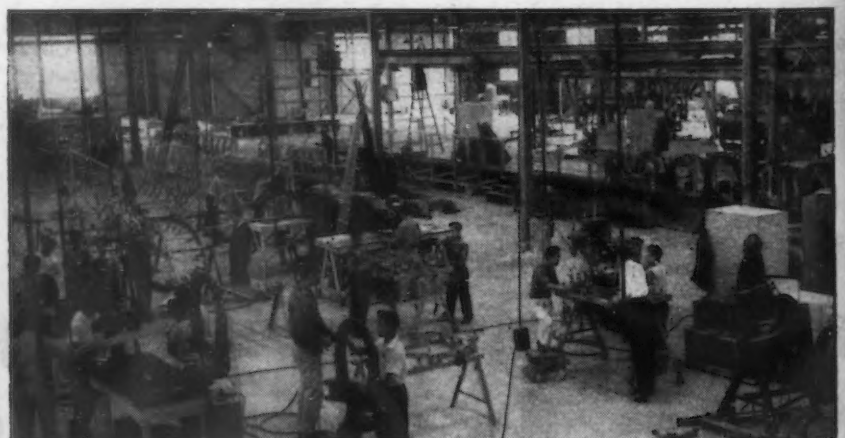
Since early this year the proposal has caused keen controversy, principally so far within the ranks of management and employers, under cover, in huddles, and behind closed doors. From now on fur will fly in the open.

**N**OT previously submitted to the state legislature or considered by any legislative committee, the measure originated in the organization of the Merchants and Manufacturers Association of Los Angeles of which Paul Shoup is president and the dominant influence. This organization counsels its members on industrial relations, and historically in

California has been the center of resistance to labor organization and proponent of an open shop policy. When petitions were first circulated early in the spring under the sponsorship of the "M. & M." and without previous consultation with other commercial, management or industrial relations bodies, there was embarrassment and controversy among principal employers of all southern California. Most war industries, including shipyards, most aircraft plants, foundries, machine shops and heavy industry, are operating under maintenance of membership contracts with organized labor. Because of coastwide wartime labor shortages, both acute and chronic, and because of serious, costly problems of absenteeism, turnover, and worker morale in general, enlightened and liberal forces in industrial relations were sincere in their effort to avoid a statewide election controversy in wartime that was sure to antagonize all organized labor, interfere with essential production, and breakdown and setback labor-management industrial relationship that have been improving, particularly in southern California.

After mature consideration, therefore, the California State Chamber of Commerce, the San Francisco Employers Council, Governor Earl Warren, and a number of other influential individuals and organizations announced their opposition to submitting the initiative proposals at this time. Great pressure was exerted on

**ALL CHINESE PLANE PLANT:** At San Francisco, Chinese workers in the \$500,000 China Aircraft Corp. turn out fuselage sections for the new Douglas A-26 Invader attack bomber. Financed through the Defense Plant Corp. China Aircraft was organized through the cooperation of American and Chinese military and civil authorities.





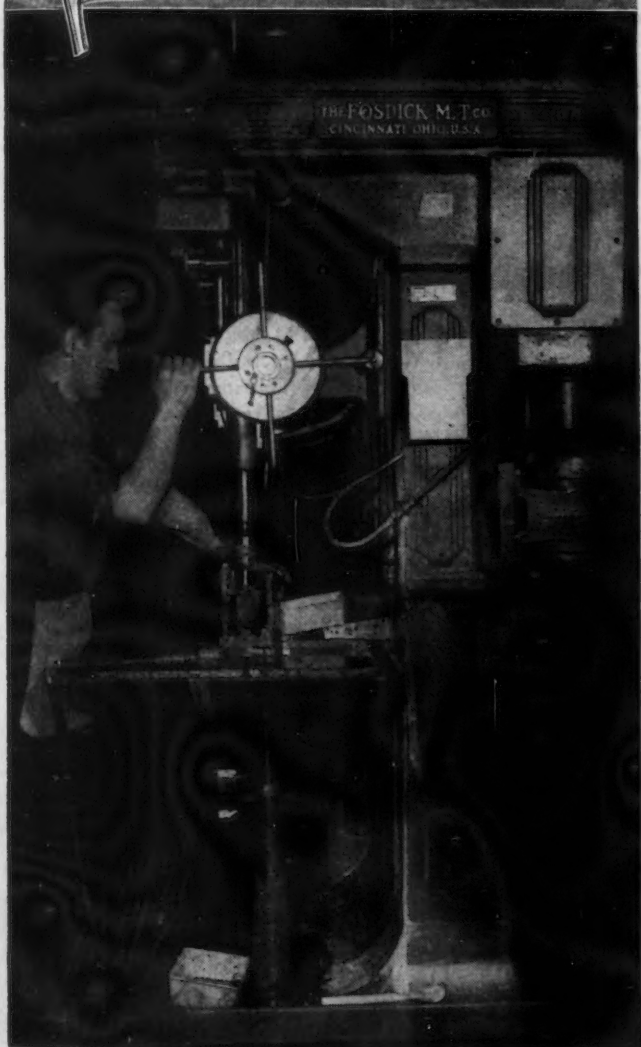


## The PILOT of this Plane The OPERATOR of the **FOSDICK DRILL** are both working for **VICTORY**

● The pilot of the plane has a definite target on every mission and the headlines tell of his successes. The operator of the Fosdick never reaches the headlines but he too has an important function. His job may be only a small part of the complete plane assembly but it means he must be on the job continuously—7 days a week—to assure a steady flow of planes to our fighting fronts.

The operator of this four spindle Fosdick High Speed Drill has every convenience at his command. The feed and speed change levers and the hand feed wheel are all at his finger tips. The four spindles enable him to move from one spindle to the other for various operations without removing work from the jig. Thus this Fosdick High Speed Drill makes it easy for the operator to obtain high production at low cost—and produce uniformly accurate work.

If you have sensitive drilling, reaming or tapping operations investigate the Fosdick High Speed Drill. Our High Speed Drill Bulletin H.S.I. gives complete information on the various types—capacities—construction features—and wide range adaptability of this modern drill. *Write for a copy today.*



The machine illustrated above is in operation at the Bell Aircraft Corporation drilling lightweight airplane parts at high speed.

# FOSDICK

## MACHINE TOOL COMPANY

CINCINNATI 23, OHIO

the conservative and irreconcilable forces behind the proposal to withhold it, at least until peacetime, or to follow the more orthodox procedure of submitting the measure first to the state legislature for consideration, followed if necessary by a referendum to the voters. For a time it appeared that insufficient signatures would be obtained, but a drive at the last moment, with 3000 volunteer petition passers in Los Angeles County, put the measure on the ballot.

Labor is naturally unanimous in bitter opposition, and it has served to unify the otherwise cool and controversial relationships of CIO and AFL. Labor leaders claim that the proposition is an attempt to breakdown all social and economic reforms that have been achieved by labor over a half century in California for its own people and for all society. It is aimed, they say, to breakdown the entire structure of unionism. It will destroy all contracts.

Management grants that it will conflict with the maintenance of membership policy of the War Labor Board and that it would make it impossible for employers to sign closed shop agreements.

**F**UNDAMENTALLY and essentially the difference of opinion over this measure represents a difference in industrial relations philosophy between southern California and the San Francisco Bay region of northern California. In the Los Angeles area, prejudice for the open shop, lower wages and cheaper labor is ingrained and traditional. Many, though not by any means all, leaders in management believe that the progress, growth and competitive position of the industrial Pacific Southwest depends upon a continuance and maintenance of the open shop or, as it is so temptingly phrased, "The Right to Work."

On the other hand, around San Francisco Bay, after years of bitter controversy, the practice as well as the principle of organized labor has been accepted. It is generally felt that responsible leadership within organized labor can only be developed in strong unions and by genuine collective bargaining, and that in the long run greater production and competitive enterprise will result from tough bargaining by equally well-organized groups on the respective sides of labor and management. Self-governing, higher-waged labor will avoid the class struggles and bitter antagonisms which constant

## Cited for Awards

• • • The following companies have received awards for excellence in war production:

### Army-Navy E

Brownsville Shipping Corp., Brownsville, Tex.  
Corinth Machinery Co., Corinth Plant, Corinth, Miss.  
Eaton Mfg. Co., Wilcox-Rich Division and Lawton Plants, Battle Creek; Wilcox-Rich Division, Marshall Plant, Marshall, and Wilcox-Rich Division, Saginaw Plant, Saginaw, Mich.  
George E. Failing Supply Co., Enid, Okla.  
North American Aviation, Inc., Main Plant and Modification Center, Kansas City, Kan.  
Ventnor Boat Works, Inc., Pleasantville, N. J.

### Maritime M

Jenkins Bros., Bridgeport, Conn. (fourth star)  
Reliance Electric & Engineering Co., Cleveland.

### Army Ordnance

Conlon Corp., Chicago.

union membership recruiting brings.

It is an interesting and significant issue and decision, but a large majority of the voters are fairly sure to miss basic implications and be deceived by superficial phrases and prejudices. When the Navy had to take over 104 machine shops in San Francisco and enforce an open shop because of recalcitrant and defiant tactics by Lodge 68 AFL, fuel was heaped on the flames. Up state and country areas, many families of servicemen, white collar workers and even some workers who have been forced to pay dues to Mother Hubbard unions during wartime, are antiorganized labor. Strikes, limitation of production, work stoppages, and apprenticeship regulations have not helped the union cause in public relations particularly in wartime. A political fight on this measure is in prospect that is fundamentally far more important to organized labor on the West Coast than the tirading overtures and doorbell ringing program of the P.A.C. Enlightened and liberal leaders in industrial relations, particularly in northern California, are worried, for they anticipate disturbance and labor demoralization if the measure should pass, and they believe it will. At the time of the primary election in California in May there were 3,370,978 voters registered and the vote was 1,884,820. The prospective registration by November should be considerably increased and the vote may well be 50 per cent greater.

\* \* \*

New war contracts assigned to the Pacific Southwest in August were

\$397,294,208.55, the largest single month since the war started. Aircraft accounted for \$291,500,000 and ship construction \$92,250,000. A little over \$2,000,000 in new construction applications were self-righteously denied by the Area Production Urgency Committee, and this one-half of one per cent of the total was said to have saved a half million man-hours for more urgent work.

\* \* \*

A prominent and responsible West Coast aircraft industry leader pointed out last week that the aircraft industry is now a 20 billion dollar one and even reduced 95 per cent postwar, it will still be doing a billion dollars, which is between 20 and 25 per cent of the volume of the automotive industry at its peak. So much postwar depends upon the peacetime military aviation program so far unannounced.

Douglas has announced that three commercial airlines have placed 50 million dollars worth of orders for 93 new highspeed four engined airliners. Lockheed announces a \$13,600,000 construction program at Burbank including a hangar, an overhaul and maintenance center, new warehouses, laboratories and a quarter million dollar cafeteria and commissary. Boeing is said to be preparing a postwar commercial transport edition of the B-29 Superfortress with larger fuselage and two-passenger levels.

\* \* \*

For the fourth quarter 18,040 more freight cars will be loaded in the territory of the Pacific Coast Traffic Advisory Board than in the same period a year ago according to estimates of shippers. This is an increase of 3.6 per cent or about 200 cars a day, bringing the estimated total up to 511,886. October is regarded as the peak freight traffic month for the entire year for the West Coast by the railroad.

\* \* \*

Hesse-Ersted Iron Works at Portland is now operating its second electric furnace and rolling approximately 4000 tons per month of bars from 1½ to 6 in. square and ½ to 2 in. flats, rounds from 1 to 4 in. and half rounds. Orders for light shapes will be accepted for the first quarter next year.

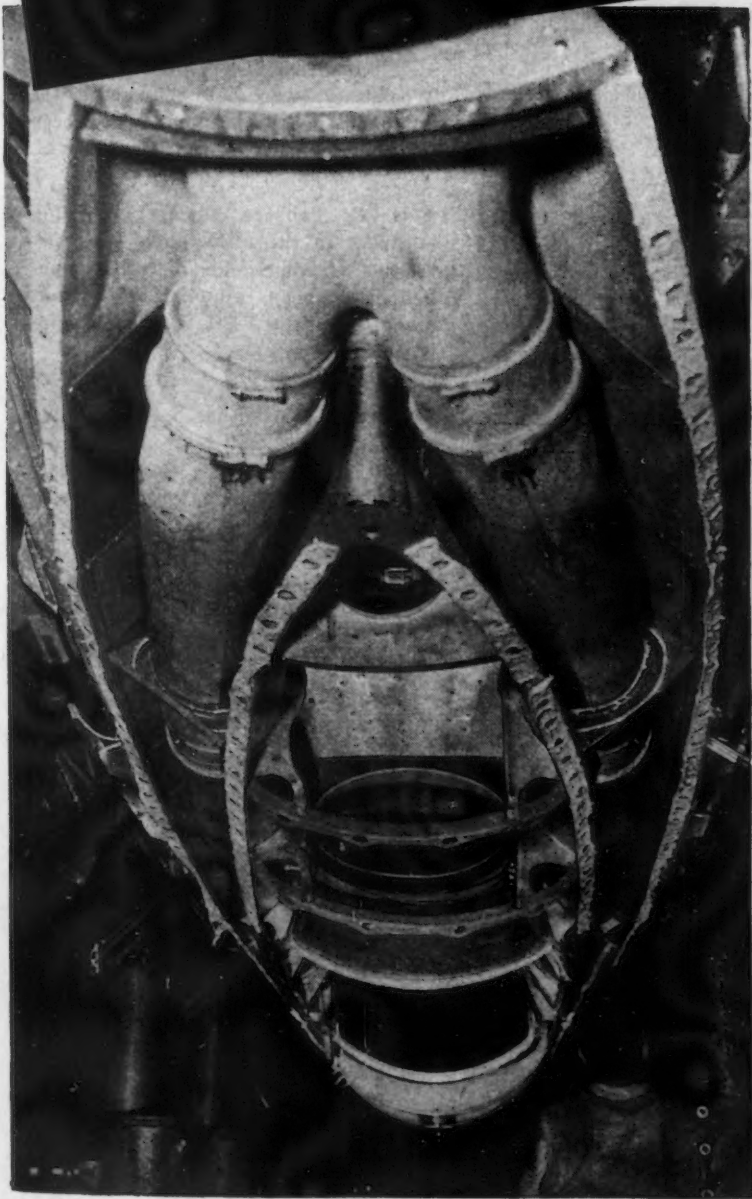
\* \* \*

General Electric has started producing electric irons at its Ontario, Calif., plant with a quota of 421,500 for this year, 40 per cent of the plant's 1940 production. The last iron made was finished in June, 1942.





## This Is How a Thunderbolt Exhales



Here is part of a hard-hitting "Thunderbolt's" exhaust system—one of the hottest spots in a fighting plane.

Exhaust gases roar through this network of piping at temperatures of 1500°F. and higher—too hot for most metals to endure. This is why ARMCO Stainless Steels are used for the complete exhaust systems in many of Uncle Sam's warplanes.

ARMCO Stainless is doing its job well too. In firewalls and exhausts these rustless, durable metals defy red hot temperatures. In many other parts light though strong sheets of this hard, tough metal resist corrosion and the vibration of roaring engines.

If you are making vital parts for America's warplanes, consider ARMCO Stainless Steels. They are supplied in the conventional types, including the Columbium and Titanium stabilized grades. And remember them where resistance to heat and corrosion are needed in your peacetime products. For complete information about ARMCO Stainless just address The American Rolling Mill Company, 2931 Curtis St., Middletown, O.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION



*The American  
Rolling Mill Company*



**VICTOR CHARTNER**, chief mechanical engineer, Wickwire Spencer Steel Co.

• **Victor Chartner** has been appointed chief mechanical engineer of the Wickwire Spencer Steel Co., with headquarters in Buffalo. He formerly was chief engineer for the Pittsburgh Steel Co. **M. G. Werme**, formerly of Wickwire's Clinton, Mass., plant, has been appointed chief development engineer with headquarters in Buffalo. **Gordon Lloyd**, former power and fuel engineer for the Carnegie-Illinois Steel Corp., has been named superintendent of the Clinton plant.

• **E. J. Lyons** has been appointed director of industrial relations for the Airplane Division of Curtiss-Wright Corp., Buffalo, to succeed **C. S. Mattoon**, recently resigned after nearly 30 years with Curtiss. **George A. Snodgrass**, administrative assistant to the Columbus factory manager, has been named assistant to **J. P. Davey**, general manager at Columbus, succeeding **Mr. Lyons**.

• **Horace W. Dietrich** has been elected executive vice-president and **James E. Maher**, vice-president, Dietrich Brothers, Inc., Baltimore, Md. **Walter D. Barnes** has been appointed secretary and assistant treasurer of the company.

• **H. L. Benner** has been appointed Detroit technical representative of the Electroplating Division of **E. I. du Pont de Nemours & Co.**, Wilmington, Del.

• **Charles T. Craig**, formerly director of purchases for the Weatherhead Co., Cleveland, has been made head of a new Chicago sales office.

## PERSONALS

• • •

• **Owen D. Young** and **Gerard Swope** have resigned as chairman of the board and president respectively of the General Electric Co., Schenectady, N. Y. **Charles E. Wilson** has been re-elected president. No announcement of a successor to **Mr. Young** as chairman has been made.

• **John Sheppard** has resigned as chief metallurgist of Kelsey Hayes Wheel Co., Detroit, to become metallurgist and assistant plant manager of Michigan Steel Processing Co., Detroit.



**WILBUR C. OSHA**, general supervisor of welding, American Car & Foundry Co.

• **Wilbur C. Osha**, general welding superintendent at a.c.f. Berwick, Pa., plant since 1938, has been appointed general supervisor of welding for American Car & Foundry Co. He will have supervision of welding operations at all 12 a.c.f. plants.

• **R. E. Bressler**, formerly vice-president and chief engineer, Kol-Master Corp., Oregon, Ill., has been elected president and treasurer to succeed the late **Joseph F. Reed**. **Henry G. Wickham** has been elected vice-president and **Joseph C. Reed**, secretary. All have been elected to the board of directors.

• **Howard C. Sauer** has rejoined the Timken Roller Bearing Co., of Canton, Ohio, as general manager of its newly-created Foreign Division. **Mr. Sauer** has until recently been chief of the Anti-friction Bearing Section of the WPB Tools Division.

• **F. Jerome Tone, Jr.**, has been appointed vice-president in charge of sales, Carborundum Co., Niagara Falls, N. Y. He succeeds senior vice-president **Charles Knupfer**, who has been assigned to special sales and executive activities. **Mr. Tone** was previously vice-president in charge of the eastern sales division. **Henry P. Kirchner**, vice-president, has been placed in charge of production and **Otis Hutchins** has been named as technical director in charge of research and process control and development.

• **Ernest P. Weckesser** has been appointed administrator to correlate all activities connected with the employment of returning veterans by the B. F. Goodrich Co., Akron, Ohio. **Mr. Weckesser**, who has been with the company nearly 30 years, has been handling selective service problems.

• **O. C. Tabbert**, formerly welding engineer in the Milwaukee sales district of Harnischfeger Corp., Milwaukee, has been appointed assistant manager of the P&H Welding Equipment Division.

• **Harold C. Olson** has been appointed sales manager and **John A. Toth** assistant sales manager, Bantam Bearings Division, Torrington Co., South Bend, Ind. **Mr. Olson** has been with the Torrington Co. since 1935, becoming assistant sales manager in 1941. **Mr. Toth** has been associated with Torrington since 1929.

**HAROLD C. OLSON**, sales manager, Bantam Bearings Division, Torrington Co.







**E. F. THEIS, president, L.G.S. Spring Clutches Corp.**

- **E. F. Theis** has been appointed president of L.G.S. Spring Clutches Corp., Indianapolis, a wholly-owned subsidiary of Curtiss-Wright Corp. Mr. Theis also will continue as manager of the Indianapolis plant of Curtiss-Wright Corp. Propeller Division.
- **R. F. Horn**, divisional superintendent in the central alloy district of Republic Steel Corp., has been placed in charge of the blast furnace and coke plant, Steel Plant and Stainless Division at Massillon, the South Sheet Division and the Canton Stark Sheet Division. **O. A. Bamberger**, formerly superintendent of the Mechanical Department at Massillon, has been made superintendent of the Massillon Steel Division. Mr. Bamberger has been succeeded by **Roland Millar** with **C. P. Houghton** as assistant superintendent.
- **Walter H. Ramsay** has been made assistant superintendent of the General Electric Co., Pittsfield, power transformer manufacturing division, a newly created position, and **Harland P. Sisk**, assistant superintendent of the distribution transformer manufacturing division.
- **Frederick K. Lovejoy** has been appointed manager of the Kansas City district sales territory of the American Machine & Metals, Inc., East Moline, Ill.
- **C. H. Reynolds**, vice-president of the Sheffield Corp., Dayton, has recently completed 25-years of service with the company.
- **Walter C. Lavers** has been advanced to the position of tool serviceman and representative at the Los Angeles branch of Kennametal, Inc., Latrobe, Pa.

• **Arthur Nutt**, vice-president of engineering, has resigned from the Wright Aeronautical Corp., Paterson, N. J., after completing 28 years of work on both Wright and Curtiss aircraft engines. He had been with Wright Aeronautical since 1930, coming to Paterson as vice-president of engineering shortly after the merger of the Curtiss and Wright interests. He had been with the Curtiss Aeroplane & Motor Co. in Buffalo since 1916.

• **E. H. Carmany** has been appointed vice-president in charge of eastern operations of the Wyckoff Steel Co., Pittsburgh. His headquarters are at the company's Empire Works in Newark, N. J.

• **Christian Steenstrup**, engineer in charge of General Electric's Refrigeration Engineering Division, Schenectady, N. Y., after 43 years of distinguished service has resigned as head of the division. He will continue for the present as consultant. **D. F. Newman**, engineer, has succeeded Mr. Steenstrup, and **L. W. Atchison**, has been appointed assistant engineer. Mr. Newman was formerly assistant engineer, and Mr. Atchison, designing engineer.

• **David J. Bonawit** has been appointed chief engineer of the Marshall-Eclipse Division of Bendix Aviation Corp., Troy, N. Y. He was formerly executive engineer of the Manhattan Division of Raybestos-Manhattan Corp.

• **Russell H. Foss** has been appointed district sales manager for the New York district of Hazard Wire Rope Division, American Chain & Cable Co., Inc.

• **Ray C. Bender** has been made Chicago district sales manager of the Alloy Rods Co., York, Pa. Mr. Bender was previously welding supervisor and engineer of the Continental Foundry & Machine Co.

• **Walter Bowers** has recently been appointed vice-president and treasurer of the Lawrance Aeronautical Corp., Linden, N. J.

• **John B. Girdler**, sales representative for the past four years, has been appointed sales manager, eastern district of the Vanadium Corp. of America, New York.

• **William F. Lahl** formerly with Crane Co., Chicago, has become associated with the Belknap Mfg. Co., Bridgeport, Conn., as vice-president in charge of engineering and industrial sales.

## OBITUARY...

• **George H. Charls**, 66, nationally known Ohio industrialist and president of Metro Coal & Limestone, Inc., Canton, Ohio, died Sept. 11. He began his career with the American Rolling Mill Co.; later became vice-president and a director of Stark Rolling Mill Co. and the Berger Mfg. Co., and in 1921 was elected president of the United Alloy Steel Corp. Mr. Charls is credited with being one of the first men to perfect and use stainless steel.

• **Philip G. Johnson**, president of the Boeing Aircraft Co., Seattle, died September 14, at the age of 49. His progress in the aviation industry was phenomenal. In 1917 he was recruited as a draftsman by William E. Boeing and advanced swiftly through the positions of plant superintendent, production manager, superintendent and secretary, vice-president and general manager. Mr. Johnson became president of the company in 1926.

• **P. Mauritz Olson**, secretary and works manager, A. H. Nilson Machine Co., Bridgeport, Conn., died recently.

• **Harry Barney**, 65, president of the Barney Machinery Co., Pittsburgh, well known among tool distributors, died recently. Mr. Barney organized his own company in 1911.

• **William A. Anderson**, president of John A. Roebling's Sons, Inc., Trenton, N. J., died September 10. He was 74 years old. Mr. Anderson joined Roebling's Sons in 1888 as a time-keeper. In 1937 he became president of the company, succeeding Ferdinand W. Roebling, Jr.

• **Dwight L. Armstrong**, vice-president of the Armstrong Cork Co., Lancaster, Pa., died September 10. Mr. Armstrong, grandson of the founder, had been with the company since 1919, advancing rapidly from various sales positions to vice-president and general manager of the Closure Division in 1933 and general executive vice-president in 1939.

• **Raymond Jones**, 41, general superintendent of Commercial Forgings Co., Cleveland, died September 10. He had been with the company 25 years.

# Fatigue Cracks . . .

BY A. H. DIX

## Dishcloth Supreme

In *Fatigue Cracks* of June 15 you state that Kavanagh & English Pty. Ltd., of Sydney, Australia, manufacture "household war goods."

Could you let me know whether they produce any special lines besides flat irons, rolling pins and vases, as I think my wife would be interested?

—A. G. Cordero, Joint Editor,  
*The Metal Bulletin*, London

Apologies to Kavanagh & English, makers of household goods. The introduction of "war" was an unaccountable lapse of our own. We don't know how it is in Mr. Cordero's country, but here the domestic armory has changed. The flat iron has an electric cord attached, which limits its range, and the rolling pin is likely to be stowed away in the attic, behind the high chair and the crib.

But then these weapons always were used more in fiction than in fact. The favorite continues to be a wet dish cloth.

## Kayo by Hall

• • • But an error we can't blame on an unaccountable mental lapse is uncovered by John Howe (General Steel Castings Corp.) Hall. Mr. Hall, a metallurgist of note, criticized the phrase "low phosphorous iron," which appeared in a recent advertisement.

Always eager to defend an advertiser, we leaped to our drugstore dictionary and discovered that *phosphorus* is the noun and *phosphorous* the adjective. We reasoned that the word was employed as an adjective and that therefore phosphorous was right.

But we reasoned incorrectly, as we are reminded by both Mr. Hall and Robert S. (U. S. Steel Corp. Research laboratory) Sosman. The word is used here as a noun (kindred cases: low carbon steel, low sulphur pig). Mr. Hall writes:

The grammarians could object to "low-phosphorus iron" and say we should use the phrase "low-phosphorus-content iron," or "iron with a low content of phosphorus, but when you say "low phosphorous iron," brother, you step on the chemist's toes!

We will never do it again.

## Pants vs. Politics

• • • We find that on the whole it does not pay to tangle with experts, for when a man approaches another's specialty other than humbly the odds in favor of him making a fool of himself are high. Our public life is confined to the time we served on our town's playground commission, which fell through after two meetings, so it is in a spirit of humility that we ask why in selling a candidate to the electorate the methods used are so different from those found successful in selling pumps, pianos, publications, and pants.

Political candidates seem to concentrate on the customers, to the neglect of the prospects. It is as if your favorite family journal, the industry's best beloved, contented itself with listening to the soft words of admirers like yourself instead of hustling around and giving the unconverted a glimpse of its charms.

People that go to political meetings are practically always automatic voters for the party holding the meeting. The candidate is therefore addressing people who are already sold. It is true that through them he reaches the prospects, but it is also true that the arguments that evoke the loudest cheers from the customers are not necessarily those that will influence the prospects. And while these cheers may warm the candidate for election or re-election, they may also delude him.

We wonder if a candidate ever tried ignoring the customers and concentrating on the unconverted, and if so, how he made out. This would necessitate an en-

tirely different approach from that now used, for as any salesman of pumps, pianos, publications or pants knows, you make the most progress by granting initially that the competing product has its points, and then telling how much better yours is. But if you begin by damning what he is using, you insult his judgment, and he gets mad, and you get nowhere.

Political experts can doubtless cite case after case where the seductive approach has been tried and found wanting, but also has the bludgeon approach, so we continue to wonder.

## Mathematical Miscue

If you want to find out what is wrong with the college wardrobe this year, take a gander at the New Deal engineering featured in a local department store ad that reads:

"Sorority Sisters shoes are to your college wardrobe what  $\pi r^2$  is to the area of a circle."

No wonder women's shoes never fit their feet. This misuse of a handy formula for finding the circumference of a circle is typical of what happens when "copy engineers" invade the field of engineering. Engineers for engineering, say!! The engineers will agree to abstain from creamy, delicious, vitamin-rich, economy size, dishpan hands if the agencies will lay off the Trautwein.

—Deac

Will Deac interrupt his sardonic laughter long enough to tell us what is the formula for finding the area of a circle? If  $\pi r^2$  isn't right then we were taken for a ride by Miss Tillotson, in 8-B, who was the principal's girl friend, God rest her soul.

## Bible Makes D.N.C.

My observation of your Distinguished Name Club is that membership is by nomination, and not by application, but I am encouraged to apply by reason of your statement that the honor is bestowed not so much because of what was thrust upon one at birth as because of what one has done with it.

Therefore, I propose my name for at least associate member, and would not serve as president even if asked.

—Guy Passmore Bible,  
Horace T. Potts Co., Philadelphia

Guy Passmore Bible is a gallant gonfalon and is fitting to wave alongside of Col. Oveta Culp Hobby, Dr. Icie Macy Hoobler, Dingle Mackintosh Foot, Imo Alma Yoho, and J. Flipper Derricotte. Granted that the new member started with a leg on the baptismal fount, he had it within his power to reduce a beautiful thing to cognominal mediocrity by concealing "Guy Passmore" under the initials G. P., which would be like covering the Kohinoor with a Bull Durham sack. But he would still have been admitted to the Club if he had harnessed "Guy." "G. Passmore Bible" isn't bad.

## Aptronym

• • • Frank Oliver of brains department and Chet Ober and Henry Leonard of the business department will bear witness to the fact that last Thursday there was a glass-laden truck on the Lexington Ave. side of the Chrysler Building, bearing a sign reading, "Glasser & Co., Glaziers, 368 Third Ave., New York."

## Puzzles

• • • Last week's eastbound ship meets 17 westbound ships.

We are scraping the bottom of our puzzle barrel, and this is a plea for contributions. The following is an insult to your intelligence, unless, before reading it, you take out your watch and solve it in your head within 15 seconds:

A man spends one-third of his money and loses two-thirds of the remainder. He then has 12 pieces. How much money had he at first?



# WAITING FOR *THIS CRANE* LOSES LOTS OF MAN HOURS



**AN EXTRA**

## *Northern* CRANE Would Save Them

Maybe they wait only a few minutes—but if they do it many times a day, plenty of man hours are lost—and you pay for them.

Moreover, the whole production schedule is slowed—time is lost everywhere—costing money and impeding your part of the war effort.

An extra Northern Crane on the runway will save all these countless minutes now being lost. Also, if you

have an extra crane you need not fear breakdown—it won't tie up your shop.

Investigate the time saving possibilities of an extra crane.

Northern Cranes are fast, powerful, strong, have fine control. They are the fine machine tools of material handling.

*Northern*

**ENGINEERING WORKS**

General Office: 2607 Atwater St., DETROIT 7, MICH.

NORTHERN CRANE & HOIST WORKS Limited • WINDSOR, CANADA  
OFFICES IN PRINCIPAL CITIES

# Dear Editor:

## STYRIAN STEEL

Sir:

KINDLY ADVISE MANUFACTURERS NAME STYRIAN STEEL.

STROMBERG CARLSON CO.

Rochester, N. Y.

● "Styrian steel" simply means steel from Austria, just as "Swedish steel" means steel from Sweden.

A form of high speed steel is "White Label" Styrian, containing either 20.5 per cent tungsten and 4.25 per cent chromium, or 15.5 per cent tungsten, 4.5 per cent chromium and 1 per cent vanadium. This steel was made by Bohler Bros. & Co., Vienna, and was imported into this country before the war by Houghton & Richards, Inc., 19 Jersey St., Boston, to which we refer you for further information.—Ed.

## IRON SILICON ALLOYS

Sir:

Please send me a copy of your Sept. 22, 1927, issue containing an article, "New Light on Iron Silicon Alloys."

A. J. MACDONALD,

Asst. to Gen. Superintendent

Hanna Furnace Corp.,

P. O. Box 216,  
Buffalo 5, N. Y.

● This is too far back to supply from our files. You might try to get the issue from H. W. Wilson, 960 University Ave., New York, a back number dealer. If not available through that source, your local public library might furnish photostats, or they can be obtained from us.—Ed.

## ENGINEERS VS. SALESMEN

Sir:

I disagree with your Aug. 17 editorial, "Successful Postwar Selling." John H. Van Deventer draws a man who knows his product, its selling points, his competitor's product, his prospects' needs and how to express his knowledge. I quote: "Having this knowledge . . . our 1945-6 model salesman will not have to read any books on sales technique in order to go to town."

Wanna bet? This is the perfect picture of a guy who would starve to death in a super-market, go bankrupt trying unsuccessfully to sell hacksaws in Sing Sing and, if he had the exclusive water concession in hell, wind up on a street corner with pencils and a tin cup. He is some man but there isn't any sales in him.

It is apparently going to take the machine tool industry a long time to learn what it took the office machine and household appliance industries a long time to learn—that it's easier to make a good machine than to sell it. The history of all American industry is strewn with the wrecks of dandy products that died because there was nobody to sell them.

They all fell on their faces the same way your 1945-6 model salesman would, if he came up against the commonest object in the United States—the man who knows what the machine will do, believes in it, likes it,

needs it, wants it, has the money to pay for it, but won't buy it till someone takes him by the back of the neck and makes him sign the dotted line.

When two engineers get together they start trying to find out which one knows the most and the next thing they do is to get into a fight. You can't sell a guy goods by fighting with him. The Model T Ford salesman were forbidden to discuss the planetary transmission, low tension magneto and other unique Ford features, or to give technical information such as cylinder bore, engine speed, road clearance, etc. They were instructed to reply to all such questions by pointing out the service the car would perform.

In other words, if Mr. Van's mythical salesman will pass up all the stuff about gear ratios, flame hardening, ball bearings, etc., and point out to the prospect that the machine will make grease cups cheaper than he is now making them, he has presented his only selling argument. When he says that the Z company in Buffalo is using these machines to do that very thing, he has proved it. Then he is down to the test of salesmanship and the place where the men are separated from the boys—the close. After that, it is up to him to jut his jaw, dominate the prospect with the emanation of his personality, shove a pen into his fist and Get That Signature. And then get the hell out of there before he can cancel.

It is significant that the best technical salesmen are invariably the boys who stood at the bottom of the class in engineering school. The boys who stood at the top get \$65-a-week jobs as buyers, using their superior knowledge to shield their weak, inferior personalities. It is the business of the salesman, the superior man who was too damn smart to take engineering seriously, to crash through this defense and thus, by getting the order, take his revenge on the bespectacled, round-shouldered, slide-rule reading, timid rival for beating him in college.

The only equipment a machine tool salesman needs is guts, personality, a strong stomach and enough sense to keep out of arguments. Brains are a handicap to a salesman.

M. A. W.

New York

## IMPREGNATED CASTINGS

Sir:

I am much interested in your Aug. 10 article, "Plastic Impregnation of Magnesium Castings" (page 63).

Several years ago I developed a method of handling exactly the same problem in iron castings. It has been entirely satisfactory and is still in

use. I am almost certain it can be used on magnesium castings.

It is very simple, requires almost no equipment and certainly would require much less labor than the method described. In my opinion, there is much less danger of the castings even leaking than with the method using plastics.

If you wish to pass this information on to concerns interested it will be satisfactory to me. I will treat some of their castings and return them for their inspection.

WILFRED H. WHITE,  
Metallurgical

Chautauqua Chemical Co.,  
25 High St.,  
Jackson, Ohio

## POROUS ALUMINUM CASTINGS

Sir:

I have been informed that in one of your recent issues you featured the treating of porous castings with a thermo-plastic material. I am interested in finding a good material to treat slightly porous aluminum castings. An important point is that the castings contain hot oil and are cooled with salt water. Therefore, the material should be able to stand up to them adequately.

H. A. G.

Montreal

● See "Plastic Impregnation of Magnesium Castings," Aug. 10, 1944, issue, page 63. "Drying Impregnated Aluminum Castings with Infra-Red Rays," Dec. 9, 1943, issue, page 64, and "Magnesium Castings Impregnated by New Method," Nov. 11, 1943, issue, page 57. Also see the foregoing letter.—Ed.

## PRECISION CASTINGS

Sir:

I am interested in obtaining a copy of an article which appeared in your Feb. 10, 1944, issue, entitled, "Precision Castings of Turbosupercharger Buckets," by Albert W. Merrick, chief, Research Department, Austenal Laboratories, Inc., New York.

G. W. KLUMPP,  
Metallurgical Engineer

Busch-Sulzer Bros.-Diesel Engine Co.,  
3300 So. Second St.,  
St. Louis 18

● Our supply is exhausted but copies can be obtained by applying to the Carbide & Carbon Chemical Corp., a unit of the Union Carbide and Carbon Co., 30 East 42nd St., New York 17.—Ed.

Sir:

I am trying to locate an article published in the late spring or early summer entitled, "The Lost Art of Wax Casting," or a similar title. Both the magazine and the exact title have escaped me, but if you published same, will you send me a copy?

G. R. CARPENTER,  
Work Simplification Dept.

Federal Products Corp.,  
1144 Eddy St.,  
Providence 1, R. I.

● See above.—Ed.



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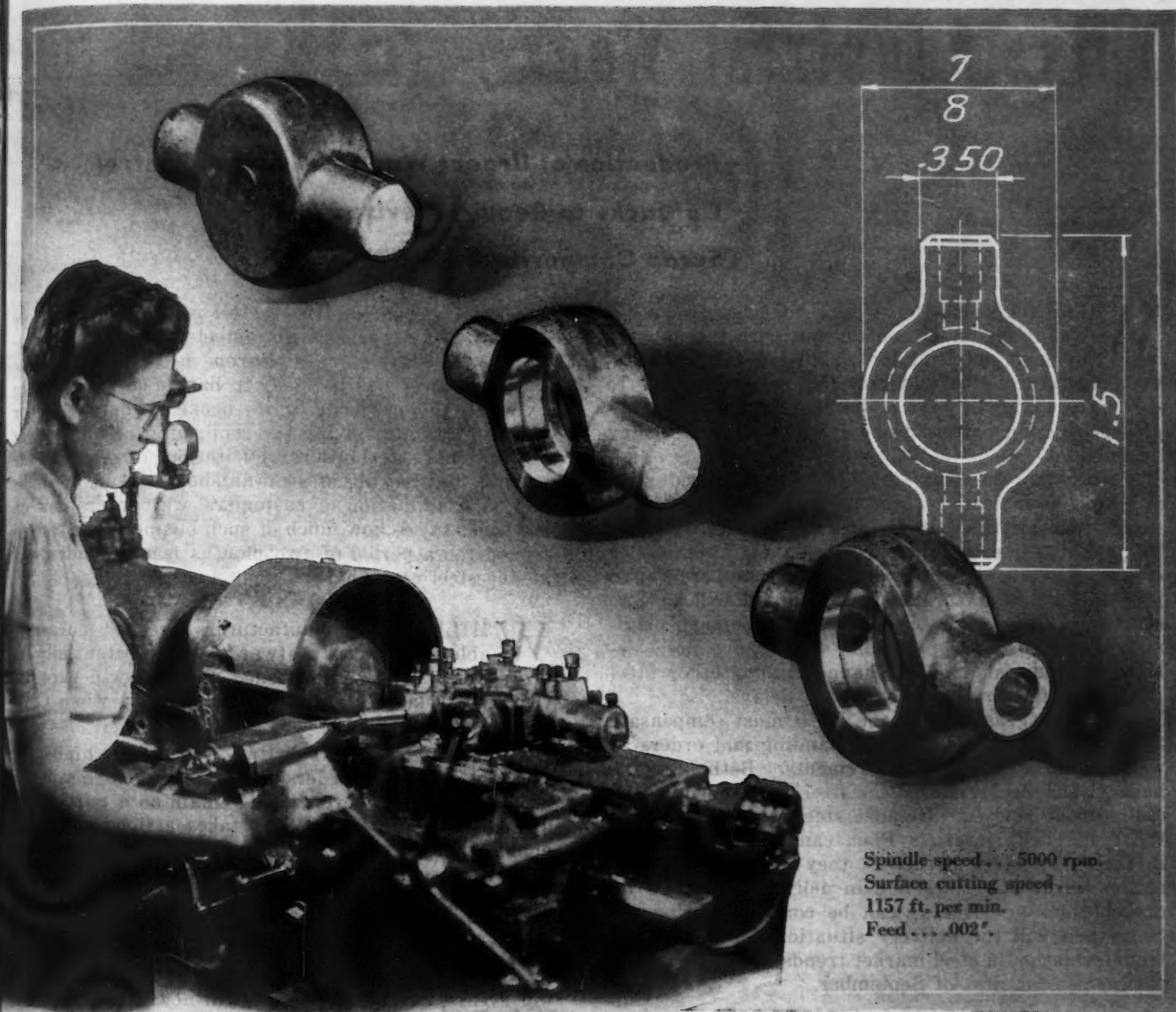
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## FROM FORGING TO FINISH IN 168 SECONDS ON A

### *Monarch Production Lathe*

At spindle speeds of 5,000 rpm., Monarch 10" Production Lathes make short work of finishing this brass forging for aircraft lubrication systems.

The first operation drills, reams, grooves (in bore), faces one side and chamfers 3 edges in 50 seconds, floor to floor.

Next, the other side is faced and one edge chamfered, in 18 seconds, floor to floor.

Finally, 2 diameter holes are step-drilled, the other end is faced and chamfered, in 50 seconds for each end. Total time, 168 seconds from floor to floor.

Such cutting speeds would not be possible were it not for Monarch's improved lubrication method for the precision bearings, permitting cool, distortionless, high precision machining. With stepless range of speeds, simple tooling, quick operating cycle and ease and speed of control, these Monarch 10" Production Lathes turn out more work per day . . . at lower costs.

When their war work is finished, they'll be quick to go into peacetime production, because their ability to cut costs will be as important then as their speed is now. If you are interested in applying Monarch 10" Production Lathes to your work, our engineers will gladly help you.

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635 Industrial Office Bldg., Newark 2, N. J.

512 Empire Bldg., Pittsburgh 22, Pa.  
Representatives in principal cities

# *Monarch Saves Time*



# This Industrial Week . .

- **Production of Urgent War Steel under Control**
- **Cutbacks to Require Revised Quotas**
- **Scrap Composite Down 37½c. a Ton**

**W**ITH the production of steel for urgently needed war items under control and with the delivery of such material meeting Armed Service requirements, the steel industry this week was able to concentrate at least part of its attention on the probable production pattern to be existent when Germany is defeated.

Although the full force of the improved steel situation, as indicated by the excess of shipments over the volume of net new orders, has not yet been reflected to its greatest extent in earlier delivery promises, a change is to be expected soon. It is apparent and probable that the War Production Board will have to rearrange October directives so that tonnage, originally earmarked for programs which have been delayed or reduced, can be channeled into other steel products now carrying long delivery delays.

Such programs which the WPB must compensate for because of cutbacks include landing mat orders as well as the steel shell requirements. Both of these have either been reduced on steel mill schedules or will soon be revised. Because steel companies, under the Controlled Materials Plan, cannot make changes in their own steel directives, they must await WPB action before the holes left in delivery schedules by cancellations or cutbacks can be completely plugged. Only then will the delivery situation full reflect the transformation in steel market trends which has taken place since the first of September.

**U**NLESS permission is given to place this ingot and semi-finished tonnage, which has been or will soon be freed, into substitute products, steel mills will have no other alternative but to reduce their operating rates. Whereas recently mills with excess finishing capacity were having some difficulty in securing ingots for further processing, now ingots and semi-finished steel are readily available. If WPB permits, the tonnage which will be shifted from the original shell steel requirements for October will mean more rails, quality bars, semi-finished, structurals and through additional finishing department openings, alloy bars.

The effect of recent cancellations and curtailments in certain war programs coupled with decreased order volume has enabled many steel companies to trim down carryovers. A few months ago carryovers, which are extensions of deliveries into a subsequent month because of non-delivery in a preceding period, were substantial on many steel items. One mill reported this week that recently it has been able to trim its carryovers about 60 per cent. It seemed apparent this week that although long deliveries were still being quoted on many items, this situation would not prevail for very long except possibly in the case of hot rolled and galvanized sheets. Because of the limited directives for the production of galvanized sheets, demand has so far outstripped production that delivery promises made this week ran from May 1945 to August 1945.

On the postwar front steel companies are more actively looking over civilian steel requirement probabilities. When victory in Europe becomes a fact one large producer will be ready to handle cutbacks to the extent of 60 per cent of its booked orders. A four-point program involving the confirming of all postwar "conditional" steel orders, solicitations of new postwar orders, the stocking of semi-finished steel in the mills and an examination of customers' war orders now on the books to see how much of such business can be confirmed for a period of two months is now under way at one steel company.

**W**HILE many manufacturers are not currently able to estimate postwar needs, substantially increased stocks of semi-finished material will expedite the shift to large scale civilian production when CMP controls are relaxed.

Postwar business solicitation is now in high gear in some areas and orders are being taken in volume. Such business, however, must remain on a purely conditional basis until the WPB takes action which will enable the processing of these orders. In some cases steel mills will take full responsibility for securing necessary governmental clearance before rolling.

**M**EANWHILE if the scrap market may be accepted once again as a partial barometer of forthcoming events, further leveling off in new business and a reshuffling of orders now on the books seem to be in the offing. Price declines in No. 1 heavy melting steel have occurred this week at Pittsburgh, Philadelphia and New York. The trend towards establishing pre-war differentials between No. 1 heavy melting steel and other grades has been extended further this week after having been established in some major districts a week ago. At Pittsburgh No. 1 heavy melting steel quotations are down 50c. a ton to \$17.50 to \$18.00 a ton. This drop plus that at Philadelphia has reduced THE IRON AGE scrap steel composite this week 37½c. a ton to \$17.625 a gross ton.

The national steel ingot operating rate this week rose two points to 97 per cent of capacity. Contributing to this increase in output were gains made in the following districts: Pittsburgh, up one and a half to 92.5 per cent; Youngstown, up half a point to 93.5 per cent from last week's revised rate of 93; Cincinnati, up eight to 103, and the Western district, up half a point to 89.5. Cleveland production declined three points to 95 per cent, last week's rate being revised to 98 per cent. Chicago output dropped half a point to 99.5 and Detroit operations fell one point to 101 per cent. In St. Louis, steelmaking was off one and a half points to 104.5 and in the Eastern district the rate decreased 12½ points to 82 per cent. Philadelphia at 98.5; Buffalo at 104.5, and Wheeling at 91 continued unchanged.

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• **SHELL PROGRAM DIFFICULTIES**—Pittsburgh reports that the heavy artillery shell program, urged in some quarters about two years ago but turned down somewhere along the line, is now meeting with difficulties which threaten its completion in the time originally scheduled. The tendency now is to level off shells through to the end of the year. Recent cutbacks in shell steel requirements were based on the inability to obtain shell-making equipment as quickly as originally anticipated. Some observers feel that while the original program itself had a good effect of impressing manufacturers with its importance, it was believed to have been far too large for full achievement to materialize. It is being hinted in some quarters that previous requirements will never be reinstated even after shell-making equipment is available. Pittsburgh opinion believes this ebbing of faith in a need for heavy shells might work to the detriment of the fighting forces if the need for this ammunition becomes paramount and if the recent thinking on the shell program is not changed. On the other hand it is pointed out that the possibility of an early victory in Europe should it materialize will not only have the effect of failing to reinstate shell steel tonnages which were cutback but will further reduce the total program. Some steel observers believe that WPB should immediately clarify the entire shell steel situation, one way or the other, in order to have the proper effect upon recent rumors.

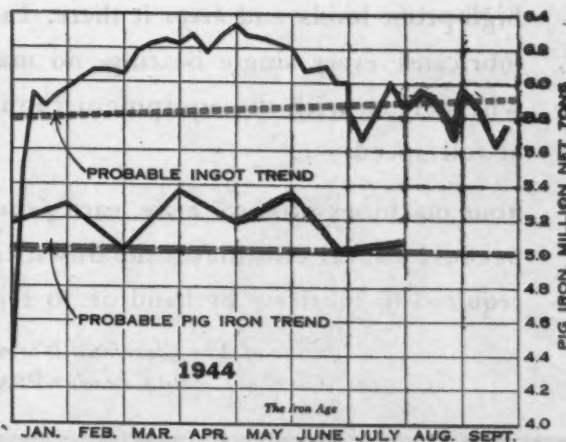
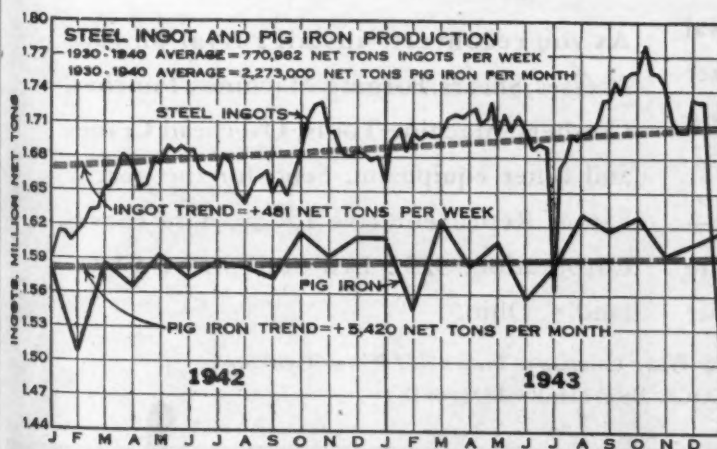
• **IRON ORE SHIPMENTS**—Shipments of Lake Superior iron ore from upper lake ports during August totaled 12,288,253 (including 62,196 from Michipicoten) gross tons, or a decrease of 1,688,517 gross tons from last year's 13,976,770 tons. Cumulative shipments for the season to Sept. 1 amounted to 54,574,155 gross tons (including Michipicoten's 302,051 tons), which was 2,214,681 tons less than the 52,359,474 tons to Sept. 1, 1943. These figures are according to report of the Lake Superior Iron Ore Association.

• **TRUCK PROGRAM**—Inquiry is being made at Detroit for approximately 12,500 tons of sheet and bar steel for a new truck program scheduled to begin late this year. The inquiry represents less than half of the steel which will ultimately be required for this cargo carrier program, split among Ford, GMC Truck and Studebaker. Machinery and equipment for manufacturing civilian goods is coming out of the warehouses where it was stored at the start of the war, and is now undergoing reconditioning. Detroit reports are that a trickling of this sort of work has begun in the machine tool companies, placed by the automobile com-

panies, with indications that more will follow shortly. Inasmuch as the great bulk of automotive production machinery was stored in warehouses or yards under grease, considerable reconditioning work may be placed later, inasmuch as factory maintenance departments are far from large enough to take care of putting an entire plant's equipment back into workable shape all at once. This automotive situation might likely be duplicated in other industries, and might be a worthwhile bit of business to be sought by tool companies whose volume is now falling off.

• **GALVANIZED SHEET CRY**—From Pittsburgh come market reports that the loudest cry of current steel users is being raised by the warehouses for galvanized sheets. There is nothing in the picture which indicates that their lot will be a happy one in the future. From coast to coast warehouses are practically depleted of galvanized sheets. When new lots come in, they are immediately drained off. One of the nation's large producers of sheets with very little plate capacity, indicates that deliveries on galvanized are now running into May, 1945. While companies manufacturing a widely diversified line of products expect a falling off of new orders, those which specialize in sheet and flat rolled products are looking forward to very heavy orders even after the war in Europe has ended. Civilian consumption of flat rolled steel and especially such products as galvanized roofing and siding and other products needed by the farmers has been curtailed during the past four years. A first-class buying spree on these commodities is expected as soon as the tight supply situation eases.

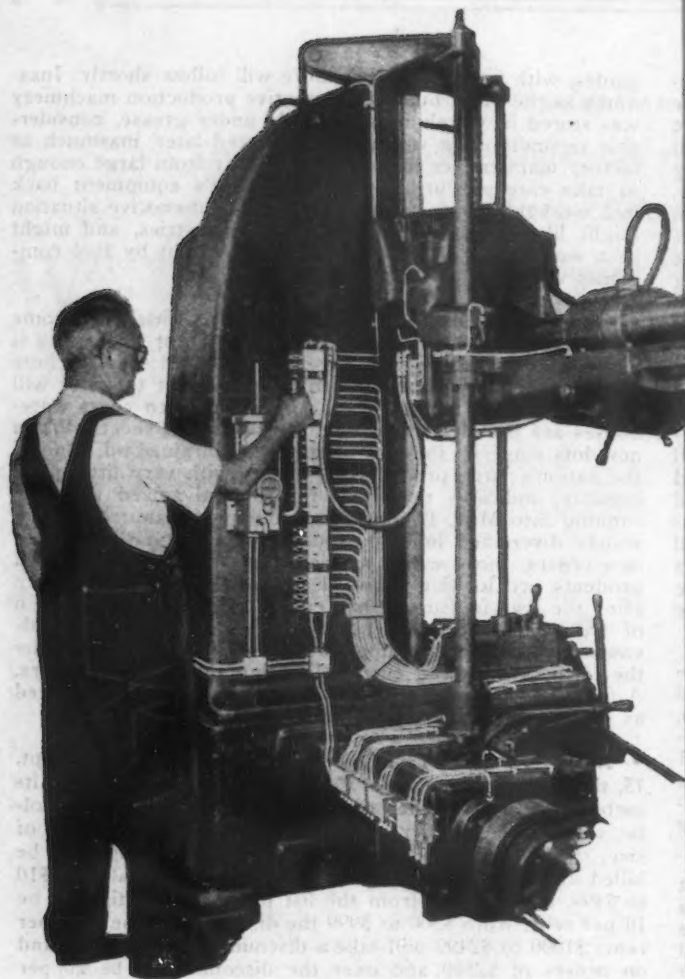
• **NEW TOOL STEEL DISCOUNTS**—Effective Sept. 15, the Firth-Sterling Steel Co. inaugurated discounts on its carbide list price of each tip. In cases where the total dollar value of each order covering tools or tips regardless of size, style or grade is less than \$10, the carbide tips will be billed at the list price. When the total dollar value is \$10 to \$499, the discount from the list price of each tip will be 10 per cent; from \$500 to \$999 the discount will be 12½ per cent; \$1000 to \$2499 will take a discount of 15 per cent and on orders of \$2500 and over the discount will be 20 per cent. All orders received on or after Sept. 15 will be priced by this method. The result according to the company will be to materially reduce its prices on both tips and tools. This latest move is interpreted in the trade as further evidence that competition on sintered carbide tools and tips continues to drive the price of these items down.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 12...	91.0	100.0	93.0*	98.5	98.0*	104.5	91.0	99.0	102.0	89.0	95.0	106.0	94.5	95.0
September 19...	92.5	99.5	93.5	98.5	95.0	104.5	91.0	99.0	101.0	89.5	103.0	104.5	82.0	97.0

\*Revised



# HOW TO LUBRICATE ALL OF YOUR BEARINGS

*at once*

**with machines  
in full operation**

**T**HE Farval Centralized System of Lubrication puts your machines on a non-stop schedule: brings production up to high-profit levels and *keeps* it there. Farval lubricates every single bearing, no matter where it is, with the equipment running at full speed.

Your machines produce *more*, earn *faster*—because Farval eliminates the down time required to lubricate by hand or to repair

the lack of lubrication. Bearings last 5 to 25 times longer—consumption of lubricant is cut by 75%. *Farval savings add up fast!*

As you reconvert—install Farval on your Presses, Shears, Forging Machines, Punches, Crushers, Machine Tools, Overhead Cranes and other equipment. Send for the nearby Farval Representative today. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

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# FARVAL

CENTRALIZED SYSTEMS OF LUBRICATION





# Steel Mills Capture Barrel and Drum Industry

## New York

By T. W. LIPPERT

• • • Long, long ago, in 1939, before the words postwar and planning were wedded, the manufacture of heavy steel barrels and drums was a rather volatile business firmly in the hands of a large number of highly individualistic entrepreneurs. Most of these fabricators had started on a precarious shoestring and were justifiably vocal in their pride of success in the classical Horatio Alger Pluck and Luck tradition.

A few weeks ago, the purchase of Bennett Mfg. Co., Chicago, by the U. S. Steel Corp. pretty well completed the capture of the entire barrel and drum business by major steel producers. Some 87 per cent of the business, representing about 435,500 tons of steel consumption yearly has been corralled by the mills, and the remaining 64,500 tons of independent capacity will probably remain so for a variety of reasons.

The question might be asked as to why the mills took the rather unusual step of taking over their customers. Probably three factors dictated the action. First and foremost is the nagging pressure of competition; like the suburbanite's frenetic efforts to constantly match neighborhood fur coat and automobile standards, so major steel makers must counter either major or minor competitive shifts or otherwise inevitably lag in the race of free enterprise. Second, mills are looking for sure outlets for the off-

grade 12 to 18 gage sheets that are progressively a more serious mill problem as specifications in the open market for prime quality sheets are screwed tighter. Third, in periods of poor consumer demand, a sure outlet in barrels and drums for over-run qualities or gages of sheets may well save the mills the necessity of throwing these materials into a contentions market to seek distress price levels.

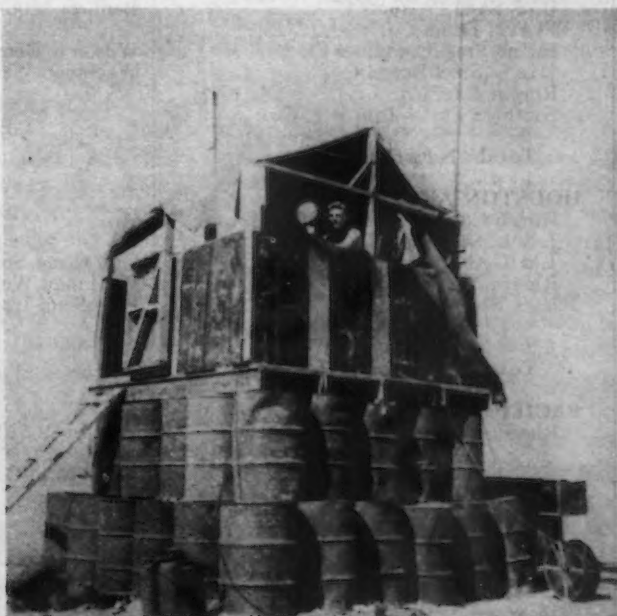
Only Wheeling Steel Co., in 1939, had a captured barrel and drum business, which engaged a small portion of the attention of the subsidiary Wheeling Corrugating Co. plant at Wheeling and the Wheeling Steel Co. plant at Portsmouth, Ohio. And, perhaps Wheeling was smartest of all

the steel makers, for it at least gradually built facilities from the ground up since 1915 and has not been faced with the necessity for integrating a number of plants with duplicating and overlapping facilities.

While the entrance of other mills into the barrel business may not have been precisely in the order as indicated herein, it does seem apparent that late in 1939 Inland Steel Co. stepped in to take over Wilson & Bennett, of Jersey City, N. J., Chicago, and New Orleans, thereby yanking some 56,000 tons of sheets out of the competitive market. Not long thereafter, the death of the owner of Boyle Mfg. Co., with plants at Los Angeles and Alameda, Calif., gave U. S. Steel an unexpected chance to purchase this company. The Corporation took the chance with exemplary promptness, and thereby took some 28,500 additional tons of sheets out of the market.

All this was probably the subject of many an acid intra-office memo in the Jones & Laughlin organization, and it was not long before it jumped in with a real splash. In quick order, J. & L. netted a plant of Standard Oil of N. J., at Bayonne, N. J.; a barrel plant that Crown Can Co. had fallen heir to at Philadelphia; and Draper Mfg. Co., Cleveland. This all brought some 50,500 tons of business on the J. & L. books for sure. Republic then came in for the first time to take over Niles Steel Products Co., Niles,

**DRUMS OF WAR:** *Always an active business, the makers of barrels and drums in wartime have occupied a doubly important role. For to barrels and drums fell the task of fueling America's far-flung armies. Below is the gasoline dump at one Army field, and when the drums are emptied their usefulness goes on; for elevated platforms of signal towers, for smokestacks, for water containers, show-ers and a multitude of other homely tasks.*



## Estimated Steel Requirements of Heavy Steel Barrel and Drum Manufacturers

Company	Former Name of Company	Plant Location	Steel Company Affiliation	Estimated Total Requirements, Net Tons
<b>ATLANTIC COAST AREA</b>				
Inland Steel Container Co.	Wilson & Bennett	Jersey City, N. J.	Inland	12,000
J. & L. Steel Barrel Co.	Standard Oil of N. J.	Bayonne, N. J.	J. & L.	20,000
J. & L. Steel Barrel Co.	Crown Can Co.	Philadelphia	J. & L.	16,500
Natl. Enam. & Stmp. Co.		L. I. City, N. Y.		7,000
Rheem Mfg. Co.		Newark, N. J.	Bethlehem	19,000
		Sparrows Point, Md.	Bethlehem	
Rheem Mfg. Co.	Atlas Steel Barrel Co.	Bayonne, N. J.	Bethlehem	25,000
United Steel Barrel Co.		Philadelphia		5,000
<b>Total—Atlantic Coast</b>				<b>104,500</b>
<b>CLEVELAND—PITTSBURGH AREA</b>				
Cleveland Steel Barrel Co.		Cleveland		5,000
Globe Steel Barrel Co.		Cleveland		6,500
J. & L. Steel Barrel Co.	Draper Mfg. Co.	Cleveland	J. & L.	14,000
Niles Steel Products Div. of Republic Steel Corp.		Niles, Ohio	Republic	10,000
Ohio Corrugating Co.		Warren, Ohio		22,000
Manion Steel Barrel Co.	Rouseville Cooperage Co.	Rouseville, Pa.		10,000
Stevens Metal Products Co.		Niles, Ohio		22,000
U. S. Steel Products Co.	Petroleum Iron Works	Sharon, Pa.	U. S. Steel	19,500
Wheeling Corrugating Co.		Wheeling, Ohio	Wheeling	22,000
Wheeling Steel Co.	Whitaker Glessner Co.	Portsmouth, Ohio	Wheeling	
<b>Total—Cleveland-Pittsburgh</b>				<b>131,000</b>
<b>CHICAGO AREA</b>				
U. S. Steel Products Co.	Bennett Mfg. Co.	Chicago	U. S. Steel	24,000
Inland Steel Container Co.	Wilson & Bennett	Chicago	Inland	35,000
National Steel Container Co.		Chicago		10,000
Rheem Mfg. Co.		Chicago (2 plants)	Bethlehem	12,000
Vulcan Stamping & Mfg. Co.		Bellwood, Ill.		2,000
<b>Total—Chicago</b>				<b>83,000</b>
<b>ST. PAUL AREA</b>				
Stainless Steel Products Co.		St. Paul		1,000
<b>Total—St. Paul</b>				<b>1,000</b>
<b>ST. LOUIS AREA</b>				
J. & L. Steel Barrel Co.	Wackman Welded Ware	St. Louis	J. & L.	6,000
J. & L. Steel Barrel Co.	Wackman Welded Ware	Kansas City	J. & L.	7,000
Natl. Enam. & Stmp. Co.		Granite City, Ill.		5,000
Niedringhaus Metal Products Co.		St. Louis		6,000
<b>Total—St. Louis</b>				<b>24,000</b>
<b>NEW ORLEANS AREA</b>				
U. S. Steel Products Co.	Bennett Mfg. Co.	New Orleans	U. S. Steel	16,000
Florida Drum Co.		Pensacola, Fla.		1,000
Inland Steel Container Co.	Wilson & Bennett	New Orleans	Inland	9,000
J. & L. Steel Barrel Co.	Wackman Welded Ware	New Orleans	J. & L.	5,000
Rheem Mfg. Co.		New Orleans	Bethlehem	9,000
Southern States Iron Rfg. Co.		Hattiesburg, Miss.		1,000
<b>Total—New Orleans</b>				<b>41,000</b>
<b>HOUSTON AREA</b>				
Hirsch Cooperage & Stl. Pkg. Co.		Houston, Tex.		2,000
J. & L. Steel Barrel Co.		Lake Charles, La.	J. & L.	5,000
J. & L. Steel Barrel Co.	Gulf Coast Steel Barrel Co.	Pt. Arthur, Tex.	J. & L.	9,000
Rheem Mfg. Co.	Wackman Welded Ware	Houston, Tex.	Bethlehem	13,000
U. S. Steel Products Co.	Petroleum Iron Works	Beaumont, Tex.	U. S. Steel	30,000
		Pt. Arthur, Tex.	U. S. Steel	
<b>Total—Houston</b>				<b>59,000</b>
<b>PACIFIC COAST AREA</b>				
Rheem Mfg. Co.		Richmond, Calif.	Bethlehem	28,000
		Southgate, Calif.	Bethlehem	
U. S. Steel Products Co.	Boyle Mfg. Co.	Alameda, Calif.	U. S. Steel	28,500
		Los Angeles	U. S. Steel	
<b>Total—Pacific</b>				<b>56,500</b>
<b>GRAND TOTAL—United States</b>				<b>500,000</b>



Ohio, thereby accounting for 10,000 tons. Next, J. & L. appeared again to purchase the Wackman Welded Ware plants at St. Louis, Kansas City, and New Orleans, while Bethlehem took over the fourth Wackman plant at Houston, Tex. This divvy of Wackman placed 18,000 tons more on the J. & L. books, and gave Bethlehem its first 13,000 tons of barrel tonnage.

By late 1941 the U. S. Steel Corp. had slipped in to nail down 49,500 additional tons through the acquisition of the Beaumont and Port Arthur, Tex., and the Sharon, Pa., plants of Petroleum Iron Works. Next on the list was the dropping of National Enameling & Stamping Co., Granite City, Ill., and the Niedringhaus Metal Products Co., St. Louis, into the pocket of Granite City Steel Co. This apparently was not an outright purchase by Granite City, but some control was exercised by Hayward Niedringhaus, president of Granite City, to pull the 11,000 tons of business represented by the two companies out of the competitive market. After this, Bethlehem made amends for a late start by consummating a real killing through the purchase of Rheem Mfg. Co., with plants at Newark, N. J., Sparrows Point, Md., Chicago (two plants) New Orleans, and Richmond and Southgate, Calif. These seven units put a total of 68,000 tons more in the Bethlehem column.

The U. S. Steel Corp. then went after the Atlas Steel Barrel Co., Bayonne, N. J., but Bethlehem outbid them with something over \$2,500,000 and thereby acquired 25,000 more tons to throw in with the Rheem group. This brought all the buying activity up into 1944, and as a finale the U. S. Steel Corp. within recent weeks purchased the Bennett Mfg. Co. units at Chicago and New Orleans, representing some 40,000 tons of additional outlet.

But what of those barrel and drum companies still in the relatively independent classification? Some are not desired by the steel companies, either because of location or for other reasons. One very desirable property that no company has been able to get a rise out of is Stevens Metal Products Co., Niles, Ohio, with some 22,000 tons of business. However, Republic for a long time has taken care of the requirements of this company practically on an exclusive basis. Hayward Niedringhaus, of Granite City Steel Co., controls National Enameling & Stamping Co., Long Island City, N. Y., but the long shipping distance precludes Granite City from supply-

### U. S. Department of Commerce Statistics on Steel Barrels and Drums

	(Number of barrels and drums, 12-gal. capacity and over)			
	JUNE 1944	MAY 1944	JUNE 1943	JUNE 1942 <sup>a</sup>
<b>Heavy Types<sup>b</sup></b>				
Production, total	1,508,833	1,539,401 <sup>c</sup>	2,387,751	1,749,099
Shipments, total	1,517,944	1,530,643 <sup>c</sup>	2,412,645	1,740,776
Stocks, end of month, total	39,564	49,470	62,989	42,153
Unfilled orders, end of month, total	3,766,593	3,432,074 <sup>c</sup>	7,611,323	1,651,855
<b>Light Types<sup>d</sup></b>				
Production, total	447,969	418,624 <sup>c</sup>	377,872	370,477
Shipments, total	461,769	420,105 <sup>c</sup>	372,058	363,568
Stocks, end of month, total	27,497	41,208	31,947	59,818
Unfilled orders, end of month, total	1,483,533	1,364,570 <sup>c</sup>	1,276,214	750,010

<sup>a</sup> Not strictly comparable with 1943 and 1944 since statistics for 1943 and 1944 include data for 10 and 5 additional plants, respectively.

<sup>b</sup> Steel barrels and drums (except beer barrels) of 19-gage or heavier steel, and steel barrels and drums made wholly or partly of 20-gage, when of other than open-head construction; also grease drums of 100 pounds capacity when made of 20-gage or heavier steel.

<sup>c</sup> Revised.

<sup>d</sup> Steel barrels and drums (except beer barrels) of steel lighter than 20-gage, including those partly or wholly of 20-gage if of open-head construction, also grease drums of 100 pounds capacity if steel is lighter than 20-gage.

ing the 7000 tons of steel requirements. Therefore, this welcome task is taken care of by the U. S. Steel Corp. Finally, Southern States Iron Roofing Co., Hattiesburg, Miss., while reputedly an independent with its 1000 tons, is in reality so obligated to the U. S. Steel Corp. that the latter has the business on pretty much of an exclusive basis.

Thus, to sum up: The 500,000 tons of steel requirements for the production of heavy steel barrels and drums in the United States in the past four years has been completely re-aligned as detailed in the table opposite, so that steel companies currently participate through outright capture or

envelopment of some sort in the following order: United States Steel Corp., 126,000 tons; Bethlehem Steel Co., 106,000 tons; Jones & Laughlin Steel Corp., 82,500 tons; Inland Steel Co., 56,000 tons; Republic Steel Corp., 32,000 tons; Wheeling Steel Corp., 22,000 tons; Granite City Steel Co., 11,000 tons; and full-fledged independents aggregating some 64,500 tons. All these tonnages are also shown on the opposite page according to geographical distribution. The Cleveland-Pittsburgh area accounts for 26 per cent of the total, the Atlantic Coast area has 21 per cent, 17 per cent is in the Chicago area, and the remainder is distributed elsewhere.

## Canadian Output Doubled Since 1939

### Ottawa

• • • Canada's war-expanded steel plants place her in a more independent position than ever to meet postwar domestic needs, and at the same time export steel for European rehabilitation, official sources said recently. The overall output of Canadian steel plants has doubled since 1939, placing the Dominion in fourth position as a steel producer among the United Nations, led only by the United States, Russia and the United Kingdom. Most spectacular increase has been in the production of alloy steels, many of them requiring great metallurgical skill, in which production has been stepped up to five times the prewar level.

Prior to the war the United States provided one-third of the Canadian steel requirements. It is expected that only one fifth of the 3,000,000 tons of steel that will be required in Canada this year will come from the United States. Coupled with this increased production have been new les-

sons for Canadian industry in the efficient use of steel, which will mean a reduction in the manufacturing costs of many articles. Before the war steel users ordered the type of steel they thought they should have and got it. With steel shortages, tight controls were clamped on and orders came under strict scrutiny. In many cases buyers found a less expensive steel would meet their needs.

Canadian industry entered the war with no experience in the manufacture of armored plate. By 1943 production filled all Canadian requirements for tanks, armored vehicles and some naval purposes. Plate production of Canadian steel mills is up 400 per cent and steel castings 240 per cent. Shell steel is being produced at the rate of 200,000 tons a year and more than 500,000 tons of steel a year is going into tanks and other military vehicles. Employment in the primary steel industry has almost doubled the 1939 figure of 19,600.

## Increased Wages in Prospect For Steelworkers and Industry Generally

By DONALD BROWNE

### Washington

• • • Increased wages are in prospect for steelworkers and industry generally.

The WLB Steel Panel handed down its report last Friday which opens up a way for the President to rationalize increases in wages as had been expected. WLB itself will hold a public hearing on the panel findings on Sept. 27 and 28.

This gives the President a month's leeway before election in which time military experts say it will be known whether Germany can hold out until next year. Labor sources here believe that the steel wages are inextricably tied up with reconversion and if the President doesn't have the excuse of declining payrolls and downgrading of workers which will come if the Germans give up before election, many believe that he would think it politically unwise to disturb the stabilization program and bury the "Little Steel Formula."

While the conclusions of the panel strongly deny the unions demands for the guaranteed annual wage, and for a rehabilitation fund for veterans, the rest of the report is what USWA Chief Philip Murray has ordered, with minor exceptions. For the most part, conclusions favoring the companies are on issues not even the wildest-eyed organized labor proponent ever dreamed USWA had a chance of getting away with.

Steel wages are stabilized, said the panel, and the effect of the wage increase will not be inflationary. Further encouragement to the Presi-

dent was given in the finding that there is nothing in the law to prevent him from increasing wages to take care of increases in the cost of living.

Since labor and industry members were poles apart in their approach to all demands, it was the vote of Public Members David L. Cole, chairman of the panel, and Nathan P. Feinsinger, vice-chairman, which swung the vote to USWA on crucial points.

While going to great lengths to say that the panel is a fact-finding and not a recommending body, and discussing the pros and cons of every question with assumed objectivity, the panel report came to definite conclusions where it seemed expedient to USWA interests.

Calling the BLS cost of living estimate inadequate because it does not reflect family expenditures resulting from involuntary changes in living habits, the panel pointed out that the latest BLS figures show a hike of 24.4 per cent in the cost of living for the entire country between January, 1941 and July, 1944. In steel towns, the increase is to 25.9 per cent.

On the other hand, the panel rejected the union's claim that the Meany-Thomas cost of living estimate of 43 per cent is correct, but thought accurate the final report of the President's Committee, that BLS figures are 3 to 4 per cent low.

A box score on what happened to the principal issues follows:

*General Wage Adjustment of 17c an hr. (CIO's)*

The panel's answer was "Yes, if you want to Mr. President."

It's within the stabilization program; it's not inflationary; the cost of living is up; steel workers wages are stabilized but suffer an inequity of 8 per cent when compared with the increased secured between 1939 and 1943 by workers in all manufacturing industries, and finally nothing in the law stops the President from increasing wages. These are the panel's answers.

*Establishment of a Fund for Steel Workers in the Armed Forces (Companies')*

The panel said that Congress was able to solve this one by passing the GI Bill of Rights. If the panel had favored it, each steelworker would have been docked \$20 out of any increase the Board finally orders. It would have only cost the companies \$40, including their "part" of the contribution which was to have equaled the steelworkers kick-in, because the \$20 would originate in the companies' treasuries in the way of increased pay.

*Guaranteed Annual Wage (Companies')*

The panel took a lot of space to justify the companies' position on this one, but insisted that it has jurisdiction to consider "novel" questions arising in wartime.

The labor member's report angrily attacked public members for agreeing with industry that the postwar period will be similar to prewar experience of a widely fluctuating production rate in the steel industry.

*Vacations (CIO's)*

This issue is one of those the Panel tried to make look as though its eyes for the union and noes for the companies were delicately balanced, so that the issue would be left up to WLB. Actually, the finding was for the union.

This is seen in the comparison of vacation practices in the steel industry with vacation customs of office and white collar workers. The tip-off came in the report that WLB has already authorized its regional boards to compute vacations on the basis of 48 hr. where the plant involved is operated on such basis.

*Dismissal Pay (CIO's)*

The Administration is given an opportunity to finally win the battle it lost when Congress turned down the Kilgore Bill providing a federal scale of unemployment insurance.

Panel reasons for favoring dismissal pay were that companies have carry-back provisions in tax laws and could absorb cost in this way; dismissal pay is not inflationary; some

### COMING EVENTS

Sept. 25-27—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 5-7—SAE National aircraft engineering & production meeting, Los Angeles.

Oct. 5-7—National Electronics Conference, Chicago.

Oct. 5-6—AIME Electric furnace steel conference, Pittsburgh.

Oct. 10-11—Gray Iron Founders' Society, Inc., Cincinnati.

Oct. 12-14—The Electrochemical Society, Inc., Buffalo.

Oct. 16-20—National Metal Congress, Cleveland.

American Society for Metals.

American Welding Society.

Society for Experimental Stress

Analysis.

American Institute of Mining & Metallurgical Engineers, Iron and Steel Division and Institute of Metals Division.

American Industrial Radium and X-Ray Society.

Oct. 31-Nov. 1-2—American Institute of Steel Construction, annual meeting, Atlantic City, N. J.

Nov. 2-3—Industrial Management Society, National Time and Motion Study Clinic, Chicago.

Nov. 27-Dec. 2—National Exposition of Power and Mechanical Engineering, New York.

Dec. 4-6—SAE National air cargo meeting, Chicago.



companies have agreed to pay it in collective bargaining.

#### *Sick Leave (Companies')*

The companies' victory on this one may be temporary until the union establishes that there are special conditions of hazard in the steel industry. The panel said that the union's position that the demand would involve no net cost has not been established, but that it may be true sick leave would increase productivity to some extent.

On the other hand, the panel reasoned that white collar and public service employees get sick leave, and safeguards should surround any sick leave system to prevent the benefits from being abused and regarded as an additional vacation with pay. It was left up to WLB.

#### *Shift Differentials (CIO's)*

The panel indicates that if the base pay of the steel workers is increased there will be no reason for granting an allowance of 5c. for afternoon shifts and 10c. an hr. on the night shift.

#### *Holidays (Companies')*

The union requested that the prevailing holidays be continued as holidays with time and one-half for all work performed on such days. Further, the union requested that holidays be considered as days worked whether worked or not, to determine whether an employee has worked six or seven days.

The panel says that the Labor Department rule is otherwise and cites a ruling of the Secretary of Labor in the case of Carnegie-Illinois Steel Corp. in which what the union is asking for was granted, but the Secretary of Labor has decided the request must come before October, 1942, thus antedating the executive order upon which the union relied.

#### *Elimination of Geographical Wage Differentials*

The panel said that it would be against the Board's established policy to accede to this union proposal at this time. This is another question upon which there was little doubt from the beginning of how the panel would rule.

#### *Rate Establishment and Adjustment (CIO's)*

While saying that "equal pay for equal work" means nothing without criteria being established, the panel indicates that WLB should set up the criteria and refer this issue to collective bargaining.

#### *Rates for Mechanical and Maintenance Operations*

The panel believes that considerable progress can be made by the parties in collective bargaining towards (1) the establishment of specific occupations and a reasonably limited number of classifications in each occupation; and (2) the establishment of specific rates for each classification.

While deciding that classification of rates for mechanical and maintenance operations should be made, the panel did not suggest that WLB make them, but referred the problem to collective bargaining.

#### *Learners (Companies')*

The union requested that learners receive no less than common labor.

The panel found that the union did not sustain its allegations that the companies have abused the exception granted in the case of learners and the panel assumed that if workers who receive the learner's rate are improperly classified an adjustment can be made through grievance machinery.

#### *Closed-Shop and the Check-Off (CIO's)*

Here the industry members' report charged that it is improper to give the check-off when the closed political alliance of CIO-PAC and CIO-USWA ARE considered. Public members paid no attention and said that no evidence has been found to justify withholding or withdrawing the standard "maintenance of membership," and checkoff clause granted by the Board in previous cases in the steel cases.

#### *Insurance Plan (Companies')*

A lengthy discussion by the panel comes to the conclusion this is company business and while it says it has authority to consider, the panel apparently knew it couldn't order group insurance for USWA, at company expense.

As usual, the Board claimed jurisdiction over all issues, even reconversion questions extending into peace. It remains for some steel company to test out these claims in court, although few doubt the result of submitting any of these questions to the present Supreme Court.

## Steel Producers Await WLB Decision

### *Pittsburgh*

• • • Steel producers are sitting back awaiting the decision of the Steel Panel with regard to the current wage fight. All believe that adjustments upward will be made in the base wage rate, which will be announced by the President just in time to alter the opinions of any doubting Thomas' at the polls in November. As pointed out by several economists this week, if such an announcement

is made by the President at any time between now and election day, cost of living increases will not be reflected until after the voting. These observers indicate that an increase in cost of living will follow the upward adjustment of steel wages by two to three months.

The Steel Case Research Committee, on Sept. 15, taking one of its last but futile shots at the CIO-USWA before the decision of the

**CENTURY MARK:** The 100th LST launched by Dravo employees, the LST 790 hits the water from the East Yard ways of the Norville Island shipyards. The LST 790 is one of the 323 fighting ships that the Dravo Corp. has built since Pearl Harbor.



panel is announced, stated that no justification for modification of the Little Steel Formula is to be found in the report of the public members of the panel of the War Labor Board.

The committee stated that "since January, 1941, increases in wages of steel workers have far outstripped the increase in cost of living. The Bureau of Labor Statistics' cost of living index rose about 25 per cent from January, 1941, to June, 1944, while the average weekly earnings of the steelworkers during that period increased over 61 per cent."

One of the sore points in the whole

case has been this cost of living index, which to all practical purposes is inaccurate or incomplete—the net effect being the same. The CIO contends that the cost of living has increased some 42 or 43 per cent.

The Steel Case Research Committee pointed out that both Congress and the President affirmed the National Economic Stabilization program recently. On June 30, 1944, the President, in approving the bill, extended the Stabilization Act for another year, stating that it represented the considered judgment of Congress that existing policies and programs are

sound and should be continued, and in passing the Act, Congress rejected all pleas that would require any general change in the wage, price and subsidy policy now in effect.

The steelworkers fight for increased wages has become a political football. Philip Murray, at Grand Rapids this week, told the convention of the CIO United Automobile Workers, that an increase in wages was a certainty. The consensus now is that politics will be the prime factor in the timing of the decision. An increase of between 7 and 8c. per hr. on base rates, liberalized vacation procedure, and possibly some sick leave benefits are expected to make up the bulk of the grants to the steelworkers, with any semblance of a guaranteed annual wage not even considered.

## Changes Procedure On "Miscellaneous" Companies' Wage Case

### Washington

... Changing the procedure originally contemplated, WLB recently adopted recommendations of the "miscellaneous" panel in the steel wage case, involving some 600 companies in steel fabricating and other industries with which USWA has contracts. Under the new policy, WLB, following a decision in the "basic steel" cases, will allow a reasonable period for further collective bargaining between parties in the miscellaneous cases after which any cases or issues which still remain in dispute will be referred to the regional boards "for processing." WLB said that it will grant a request by any company which prefers to have its case referred to a regional board after the "basic steel" decision is announced, without further collective bargaining. Originally the board planned that some or all of these cases were to be heard by the "miscellaneous" panel itself, either in Washington or elsewhere.

The panel report took account of the board's previous statement that the "basic steel" decision would not determine the issues in the "miscellaneous" cases. The panel majority pointed out that the union demands were the same in the "basic steel" and "miscellaneous" cases. The majority believed that the board's decision in the "basic steel" cases would undoubtedly eliminate or narrow the issues in the "miscellaneous" cases, and that in many instances the remaining issues would be resolved by further collective bargaining.

## Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

Based on Reports by Companies which made 98.3 Per Cent of the Open Hearth, 100 Per Cent of the Bessemer, and 87.9 Per Cent of the Electric Ingot and Steel for Castings Production. Source: American Iron and Steel Institute.

### 1944

PERIOD	ESTIMATED PRODUCTION—ALL COMPANIES						Calculated* Weekly Number Production of all Weeks Companies in (Net Tons) Month			
	OPEN HEARTH		BESSEMER		ELECTRIC			TOTAL		
	Net Tons*	Per Cent* of Capacity	Net Tons*	Per Cent* of Capacity	Net* Tons*	Per Cent* of Capacity		Net Tons*	Per Cent* of Capacity	
January.....	6,769,438	97.2	439,551	85.4	377,751	83.3	7,586,740	95.6	1,712,582	4.43
February.....	6,410,338	98.5	409,781	85.2	368,555	87.0	7,188,674	96.9	1,736,395	4.14
March.....	6,976,450	100.1	455,368	88.5	388,408	85.7	7,820,226	98.5	1,765,288	4.43
1st Quarter.....	20,156,226	98.6	1,304,700	86.4	1,134,714	85.3	22,595,640	97.0	1,738,126	13.00
April.....	6,768,895	100.3	437,517	87.8	362,118	82.5	7,568,530	98.5	1,764,226	4.29
May.....	6,860,532	98.5	438,980	85.3	380,960	84.0	7,680,472	96.8	1,733,741	4.43
June.....	6,452,087	95.6	418,117	83.9	347,028	79.0	7,217,232	93.9	1,682,338	4.29
2nd Quarter.....	20,081,514	98.1	1,294,614	85.6	1,090,106	81.9	22,466,234	96.4	1,726,844	13.01
1st 6 months.....	40,237,740	98.4	2,599,314	86.0	2,224,820	83.6	45,061,874	96.7	1,732,483	26.01
July.....	6,723,994	96.7	415,593	80.9	334,710	74.0	7,474,297	94.4	1,691,017	4.42
August.....	6,691,262	96.0	429,637	83.5	348,901	77.0	7,469,800	94.1	1,686,185	4.43

Note—The percentages of capacity operated are calculated on weekly capacities of 1,572,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944, as follows: Open hearth 82,223,610 net tons, Bessemer 6,074,000 net tons, Electric 3,350,880 net tons.

\* Revised January through March, 1944.

### 1943

PERIOD	ESTIMATED PRODUCTION—ALL COMPANIES—						Calculated* Weekly Number Production of all Weeks Companies in (Net Tons) Month			
	OPEN HEARTH		BESSEMER		ELECTRIC			TOTAL		
	Net Tons*	Per Cent* of Capacity	Net Tons*	Per Cent* of Capacity	Net Tons*	Per Cent* of Capacity		Net Tons*	Per Cent* of Capacity	
January.....	6,576,788	97.8	478,161	85.9	369,573	95.5	7,424,522	96.8	1,675,964	4.43
February.....	6,031,605	99.3	447,810	89.1	345,189	98.8	6,824,604	98.5	1,706,151	4.00
March.....	6,787,902	100.9	503,565	90.4	383,111	99.0	7,674,578	100.0	1,732,410	4.43
1st Quarter.....	19,396,295	99.3	1,429,536	88.4	1,097,873	97.7	21,923,704	98.4	1,704,798	12.86
April.....	6,510,824	99.9	482,478	89.5	380,401	101.5	7,373,703	99.3	1,718,812	4.29
May.....	6,069,703	99.1	452,424	86.6	397,564	102.7	7,549,691	98.4	1,704,219	4.43
June.....	6,202,889	95.2	453,663	84.1	382,801	102.1	7,039,353	94.8	1,640,875	4.29
2nd Quarter.....	19,383,416	98.1	1,418,565	86.8	1,160,766	102.1	21,962,747	97.5	1,688,144	13.01
1st 6 months.....	38,779,711	98.7	2,848,101	87.6	2,258,639	99.9	43,886,451	98.0	1,696,423	25.87
July.....	6,556,794	96.8	466,345	90.6	384,737	91.9	7,407,876	96.2	1,675,990	4.42
August.....	6,700,118	98.7	484,847	94.0	401,499	95.7	7,586,464	98.3	1,712,520	4.43
September.....	6,646,968	101.4	480,757	96.4	386,614	95.4	7,514,339	100.7	1,755,687	4.28
3rd Quarter.....	19,903,880	99.0	1,431,949	93.6	1,172,850	94.4	22,508,679	98.4	1,714,294	13.13
9 months.....	58,683,591	98.8	4,280,050	89.5	3,431,489	98.0	66,395,130	98.1	1,702,439	39.00
October.....	6,892,029	101.6	513,585	99.5	408,503	97.4	7,814,117	101.2	1,763,909	4.43
November.....	6,543,204	99.6	440,878	88.2	387,893	95.5	7,371,975	98.6	1,718,409	4.29
December.....	6,502,980	96.0	390,979	75.9	361,185	86.3	7,255,144	94.2	1,641,435	4.42
4th Quarter.....	19,938,213	99.1	1,345,442	87.9	1,157,581	93.1	22,441,236	98.0	1,707,857	13.14
2nd 6 months.....	39,842,093	99.0	2,777,391	90.8	2,330,431	93.7	44,949,915	98.2	1,711,074	26.27
Total.....	78,621,804	98.9	5,625,492	89.1	4,589,070	96.7	88,836,366	98.1	1,703,804	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,300 net tons electric ingots and steel for castings, total 1,731,602 net tons; based on annual capacities as of January 1, 1943, as follows: Open hearth 79,180,890 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons. Beginning July 1, 1943, the percentages of capacity operated are calculated on weekly capacities of 1,531,789 net tons open hearth, 116,494 net tons Bessemer and 94,667 net tons electric ingots and steel for castings, total 1,742,950 net tons; based on annual capacities as follows: Open hearth 79,867,450 net tons, Bessemer 6,074,000 net tons, Electric 4,935,960 net tons.

\* Revised January through December, 1943.



## AFA Board Approves Expansion Of Technical Activities and Program

### Chicago

• • • Expansion in the technical activities of the American Foundrymen's Association and creation of a technical development program has been approved by the association board of directors.

The program will be under the direction of N. F. Hindle, formerly assistant secretary. The functions of the program will include principally revision and publication of special books and pamphlets on specific phases of foundry practice; collection, review and correlation of published and unpublished data; promotion and co-ordination of investigations now being carried on by the association; establishment and development of broader library facilities; establishment of broader abstract and bibliographic services; and development of material for presentation before association chapters and other engineering and technical groups.

As director of the program, Mr.

Hindle will head the new setup under the general supervision of R. E. Kennedy, association secretary, and work with an advisory committee composed of three members of the Board of Directors and representatives from management, technical, and operating groups of the various branches of the industry.

Chairman of the advisory committee is S. V. Wood, president and manager, Minneapolis Electric Steel Castings Co., Minneapolis, a national director of the association. Other members are: Max Kuniansky, vice-president and general manager Lynchburg Foundry Co., Lynchburg, Va.; Walton L. Woody, vice-president in charge of operations, National Malleable & Steel Castings Co., Cleveland; Dr. D. Basch, consultant, General Electric Co., Schenectady, N. Y.; Hyman Bornstein, director of laboratories, Deere & Co., Moline, Ill.; George K. Dreher, vice-president in charge of manufacturing, Ampco

Metal, Inc., Milwaukee; C. J. Freund, dean of engineering, University of Detroit, Detroit; James H. Lansing, consulting engineer, Malleable Founders' Society, Cleveland; F. A. Melmoth, vice-president in charge of operations, Detroit Steel Casting Co., Detroit, and H. S. Simpson, chairman of the board, National Engineering Co., Chicago.

Other staff officers of the association elected, in addition to Mr. Hindle, by the directors were R. E. Kennedy, secretary; C. E. Hoyt, treasurer; Miss Jennie Reininga, assistant treasurer; and William W. Maloney, formerly assistant secretary, business manager.

### Union Defeated in Election

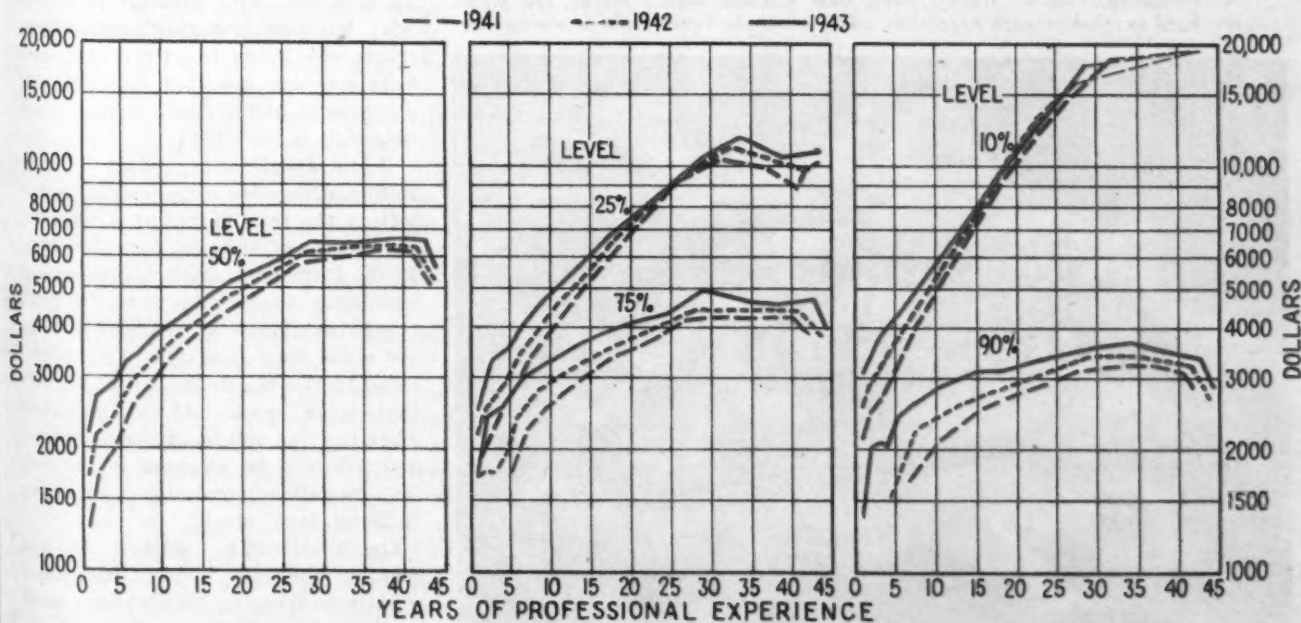
Hamilton, Ohio

• • • The United Steelworkers-CIO has been defeated in an NLBR collective bargaining election at the plant of The American Rolling Mill Company here. The CIO was the only union on the ballot and was rejected by a vote of 216 to 178, with seven votes challenged. This is the fifth election in Armco plants in which the CIO has failed to gain a majority.

**INCOME CHANGES:** On the chart below, it is possible to trace the changes that occurred in incomes earned by members of the American Chemical Society in 1941, 1942 and 1943, and to compare them with their years of professional experience. Note that at all experience levels the incomes of such members exceeded those reported for 1942 and these in turn exceeded those reported for 1941. For example, at the 4.5 years' experience level median earnings in 1941 were \$2199 a year. In 1942

similarly experienced members earned \$2541 a year and \$3064 a year in 1943, an increase over 1941 of 39 per cent. At succeeding experience levels the differentials in incomes gradually narrowed, and at the 25 years' experience span was of the order of 16.6 per cent as derived from an increase of \$900 a year by 1943 over the income of \$5400 a year reported for 1941. At all earnings levels this narrowing of differentials was found to exist with increase in the experience spans.

ANNUAL INCOMES OF REPORTING MEMBERS IN 1941, 1942 AND 1943  
ACCORDING TO YEARS OF PROFESSIONAL EXPERIENCE



## Ordnance Sees Speedy Contract Settlements When Germany Is Defeated

### Pittsburgh

••• Experience in the termination of contracts by the Pittsburgh Ordnance District, which handles about 60 per cent of the war contracts in this area, indicates that all contracts that are cancelled on the defeat of Germany can be finally settled within three months of the date of cancellation. This has been evidenced by the fact that from February, 1942, through Aug. 31, 1944, a total of 435 prime contracts have been cancelled, valued at \$250,000,000, of which 412 have been completely settled. Of the 23 unsettled contracts, none has been outstanding in excess of six months.

On the average, the 412 settled contracts have been made on the basis of 83.5 per cent of the claims originally filed before disposal credits, which compares with settlements of between 80 and 81 per cent for World War I contracts. Credits for the disposal of property in connection with the claims amounted to 10 per cent, making the net settlement of about 73 per cent of the average original claim.

From Jan. 1 to Aug. 31, 1944, \$6,500,000 worth of property has been disposed of in connection with termination settlements. Some \$1,500,000 of this property has been transferred to the government at full price for

use in the ordnance program. This includes finished and partially finished parts that could be used by other contractors on the same type of work or that could be used as spare parts by the services. Raw materials were disposed of at about 65 per cent of cost, while work in process and finished parts have been disposed of at about 80 per cent, on the average, of original cost. Special equipment, such as tools, jigs, fixtures, etc., brought only 15 to 30 per cent of cost, much of which had to be scrapped. On \$1,500,000 worth of work in process scrapped, only 6 per cent of cost was realized. Cutting tools, jigs, dies and fixtures were scrapped, on which realization was only one per cent of cost.

In the realization of part of the cost on various materials not made up into finished products, there is every indication that this will drop sharply at the close of the European war. For example, work in process, valued at \$1,766,000, showed that \$335,000 was transferred to the government at cost; \$199,000 was disposed of for other uses with 80 per cent recovery; and \$1,566,000 was disposed of as scrap at 6 per cent recovery. Currently 85 to 95 per cent of work in process is scrap, but at the

time of the German defeat at least 95 per cent will be scrap. Examples of cost recovery on work in process disposal at the termination of certain typical contracts are shown in the accompanying table.

In examining the cancelled contracts and new business placed by Pittsburgh Ordnance, it is apparent that currently terminations are running higher than new business placed. Of course, much of the business placed is not under the classification of new business, being a continuation of con-

Typical Cost Realizations on Disposal of Work in Process on Termination of Contracts in the Pittsburgh Ordnance District

Company	Material for Disposal	Cost Value, Dollars	Recovery, Per Cent	Recovery Value, Dollars
A	Billets.....	39,000	81	31,600
B	Mechanical tubing.....	74,000	24	17,760
C	Jigs, tools, etc....	154,000	0.003	462
D	Special tooling...	112,000	0.0006	67

tracts that are already in existence. From February, 1942, to August, 1944, some \$1,000,000,000 in contracts have been awarded. Since July, 1943, 285 of the 435 terminations have been made, totaling about \$200,000,000. During the past six months, a total of \$226,000,000 in contracts have been placed. Monthly, these awards were: March, \$41,000,000; April, \$55,000,000; May, \$42,000,000; June, \$75,000,000; July, \$6,000,000; and August, \$7,000,000. The sharp drop is accounted for by the fact that by July contracts for the heavy artillery shell program were awarded, and not much new business has been coming in. July was the all time low, with contractors loaded with business and continuation contracts now going in. Currently, cancellations are low, but this will not continue to be the case for very much longer, it is expected.

While a determined effort is made to find other uses for property that is left on the termination of a contract, the volume of material is tremendous. In the Pittsburgh district, ordnance is scrapping everything that it can't otherwise dispose of or cannot foresee a use for. Stocking of such material is at a minimum, since it is felt that large stocks of war materials after the war will be of use to no one, and will only be scrapped in the end. To forestall accumulations, scrapping is being done now.

On terminating contracts, it was pointed out one factor that aided greatly in speeding terminations is an accurate inventory record, based on physical count or weight.

**HEDGEROW PLOW:** A hedgerow plow is affixed to a Nazi light tank somewhere in Normandy, France. Manufactured from German breech blocks, the plow was used to crash through hedgerows which cover the countryside in Normandy.





## Hinckley Announces Second Step In Speeding Up Contract Settlement

### Washington

• • • Robert H. Hinckley, director of Contract Settlement, has announced a second step to speed up settlement of war contracts. Contracting agencies were directed to provide war contractors with adequate interim financing within 30 days after proper application under the provisions of General Regulation No. 2, issued by the Office of Contract Settlement. The intent of Regulation 2 is to make partial payments in the largest amount believed reasonable on the basis of allowable allocable costs.

Under the second regulation a prime contractor or subcontractor whose war contract has been canceled can file application immediately for partial payment of the costs incurred by him that are allocable to the terminated portion of the contract. It was pointed out that the making of partial payments does not relieve the contracting agencies of the responsibility for making the final settlements with the utmost promptness. It is provided that immediate partial payments of at least 75 and up to 90 per cent of estimated costs shall be made within 30 days of application by the contractor. Upon submission of adequate accounting data, additional payments may be made.

Partial payments are to be made to prime contractors on their own applications and on applications of subcontractors submitted through the prime contractors and any intervening subcontractors to the government. A standard form to be used in making this application accompanies the regulation.

Provision is made for immediate partial payments based on contractors' estimated allocable costs; for cost-supported partial payments where detailed accounting data have been presented and for controlled partial payments where potential insolvency of a contractor requires protection of the government's interest or the interest of a subcontractor.

Mr. Hinckley said provision had been included for making partial payments direct to subcontractors in exceptional cases where unwarranted delay would be caused by dealing only through the prime contractor and intervening subcontractors. In cases of subcontractors below the first tier, who of necessity must file their claims through contractual channels, it may

be more expeditious for such lower tier subcontractors to avail themselves of interim financing through the guaranteed termination loan (T-loan) procedure as described by the Director of Contract Settlement in his Regulation 1.

T-loans enable any war contractor to convert into cash at his local bank approximately 90 per cent of the sound value of his war assets frozen

by contract termination. After the last war, many claims for contract settlement were tied up for a year or more because machinery was not then available for interim financing. In this war, with 50 per cent of our productive capacity devoted to war contracts, it is essential, the Office of Contract Settlement pointed out, to make possible immediate reconversion to peacetime production. The two regulations make it possible for factories to begin promptly upon termination of war contracts to direct their energies to peacetime production, Mr. Hinckley said.

## Survey Queries Veterans on Job Views

### Chicago

• • • Most employees of Inland Steel Co.'s Indiana Harbor, Ind., plant on leave of absence with the armed forces will return to work for the company when released from the services initial returns from a postcard survey by the company showed.

Through its plant industrial relations office, Inland mailed postcard questionnaires to a majority of its more than 4000 Indiana Harbor employees still serving in various theatres of war. Replies have been received from 610 veterans, 94 per cent

of whom stated that they plan to resume work at Inland when they have finished their military task.

Some declared that they had acquired new skills during their military service, particularly those with more extensive service records. Whenever possible, it is stated, the company plans to allow returning veterans to further develop such new skills pertaining to plant jobs.

It was indicated 225 veterans already have returned to work with the company, eight of them wounded veterans who have become adjusted to civilian duties again.

**NEW SPITFIRE:** An RAF pilot climbs out of a Spitfire Mark XIV, equipped with a 5-blade propeller, at an English air base. Powered by a new model Rolls Royce engine which develops over 2000 hp, the Mark XIV is the fastest plane in the RAF.



## WPB Announces Reserve of 37,000 Tons of Steel for Non-Military Items

### Washington

• • • Pointing out that most of them are still in the paper stage, and depend upon the availability of facilities, manpower and components, WPB has announced that a reserve of 37,000 tons of carbon steel plus other materials in proportion has been set aside for the fourth quarter of 1944 to cover a number of contingent, non-military production programs. These programs, were set up by the WPB's Office of Civilian Requirements, the WFA, ODT and WPB's Office of War Utilities.

The programed items are domestic mechanical refrigerators, domestic washing machines, sewing machines, vacuum cleaners, miniature incandescent lamps, electric ranges, batteries for farm radios, electric fans for industrial and commercial use, commercial laundry and dry cleaning equipment, electric sewing machines, class "B" oil burners, stokers of classes A and B, domestic electric water heaters, electric and spring wound alarm clocks, oil storage tanks, insect screen cloth and hydro-pneumatic tanks.

In addition to the reserve for the foregoing programs, for which the feasibility of manufacture is being studied, further material was made available for three other products which have been in production. These items are carpet sweepers, wash boilers and radio vacuum tubes, but production is not at a level that will

make the products generally available.

The WFA, ODT and OWU programs for which part of the material has been allotted and for which production feasibility is being studied are: Farm freezers for WFA, watt-hour meters for OWU and railroad passenger cars and light trucks for ODT.

In addition, a constant watch is being kept on the feasibility of increasing existing production of such products as fractional horsepower electric motors, typewriters and con-

struction machinery, WPB officials said.

Also prior to the end of the war in Europe, when most controls are to be removed, the OCR is seeking to carry out a very large number of programs covering consumer durable goods shortage items listed by WPB Chairman Donald Nelson in June 21. In most cases the production of these items is less complicated than that of the programs provided for in the 37,000 ton reserve and many of them are being undertaken in connection with the "Spot Authorization" order. Material for this order has been provided by the Requirements committee to the extent of 100,000 tons of carbon steel, 25,000 tons of alloy steel, 15,000 lb. of copper, and adequate amounts of aluminum.

## New Revisions Seen in Plane Output

### Washington

• • • With the shifting emphasis of the air war, as illustrated by growing needs for certain types of long range bombers, fighters and transports, the War Department has reported to the WPB Production Executive Committee that a further revision of future aircraft production schedules is necessary. Certain types of aircraft for which there is a diminishing demand are being cutback to lower schedules in five plants to provide space, equipment and labor to be used in the manufacture of airplanes for which there is a growing need, the Army Air Forces reported. In some cases the cutbacks extended

as far into the future as December, 1945. The Army indicated that no labor is to be released in four of the five plants, while in the fifth plant the release of workers, if any, cannot be determined at this time.

Additional workers will be needed in the Curtiss plant in Buffalo where future production of 435 P-40's has been eliminated to make way for increased production of badly needed C-46 transport planes. Bell Aircraft, whose future schedule of P-63 planes was cut by 325 units, has indicated that additional workers will be needed because it will continue at or in excess of present production schedules. Future production of 1947 P-38's has been cancelled so that the plant can increase its production of B-29's. A cutback of 1286 C-47 ships has been ordered at the Douglas plant in Oklahoma City, owing to reduced demands for this model. The cutback, the Army said, which will extend through December, 1945, will be very gradual during the remainder of the present year.

### Expansion Still Lingers

#### Washington

• • • Though emphasis is being placed on X-Day and reconversion, the days of expanding war facilities still linger. Evidence of this was the approval of WPB Facilities Committee of an expansion of facilities of the General Electric Co. to increase capacity for fractional horsepower ac. motors to reduce the present backlog of unfilled orders. The project will cost \$550,000 and will be financed by the company.

**SAIPAN RAILROAD:** Marine technicians, using supplies the Nips had no time to destroy, put into operation an enemy railroad on Saipan. The Leathernecks repaired and were using the railroad within two weeks after capture of the island.





## Maverick Offers 10-Point Plan To Save U. S. From Economic Collapse

### New York

• • • A ten-point program for "re-conversion to save the United States from economic collapse" was offered by Maury Maverick, chairman of the Smaller War Plants Corporation, speaking before the business-government conference of the Research Institute of America here last week.

Leo Cherne, executive secretary of the institute, introduced the salty Texan to the conferees by recalling that Henry Wallace once characterized the SWPC chairmanship as "a sure road to oblivion." Mr. Cherne added that in the case of the present chairman, Mr. Wallace is undoubtedly wrong as Mr. Maverick is a "maverick" in more ways than one. (Webster defines "maverick" as an "un-branded cow. Especially a motherless calf." Ed.)

As SWPC chairman, Mr. Maverick wanted it made plain that the corporation's interest in little business "is not based on any fear of, or hostility toward big business as such," and that it has no quarrel with honest, efficient, big and competitive organizations. But he wanted it made equally plain that little business is not being "coddled" and that all the little businessman wants is a fair chance to work freely and to be assured that he will not be discriminated against.

"Half a million small concerns," Mr. Maverick continued, "have gone out of business during the war. This trend must be reversed. We must not only bring back the 500,000 which have gone out but also plan for a net gain of a million new businesses."

In discussing the ten-point program, Mr. Maverick pleaded for courage and aggressiveness to face the new problems. He pointed out that time is short and that government and business must be ready to act quickly in many new ways. "Unless we meet the first months of reconversion successfully, we may face serious political and economic convulsions."

The program, as offered by the SWPC chairman, follows:

1. The principle of free enterprise and private initiative must be accepted as the basis of our future society. This initiative must be shown through the American worker, farmer and business man, but all accepting governmental responsibility.

2. Monopolies and cartels must be wiped out and kept out, as free enter-

prise cannot exist at the same time.

3. In connection with relaxation of WPB controls little business must gain full and fair access to materials. If not, the imposition of controls and quotas will and should be inevitable.

4. There must be full speed ahead in matter of contract termination. Business men, both large and small, must not be made to wait unduly for settlement of claims.

5. Policies concerning disposal of all types of surplus properties should be established and put into operation at the earliest possible moment. These policies must include wide distribution of goods, broken down in small lots.

6. Small business must get adequate financial opportunity. This includes interim financing, reconversion loans, and removal of hardships which now exist in field of equity capital, intermediate and long-term financing. Because of recent relaxations it is imperative that Congress legislate at once to grant guaranty and financial power to SWPC for small business.

7. There must be a tax program which will encourage venture capital; small, new business, exemptions to encourage risk taking.

8. For small and all business, a system of technical advisory assistance, and a method to make new products available to small business must be established. Developments from

government financed war plants, and latest methods should be accessible to all.

9. Every aid and encouragement should be given to veterans in setting up independent business.

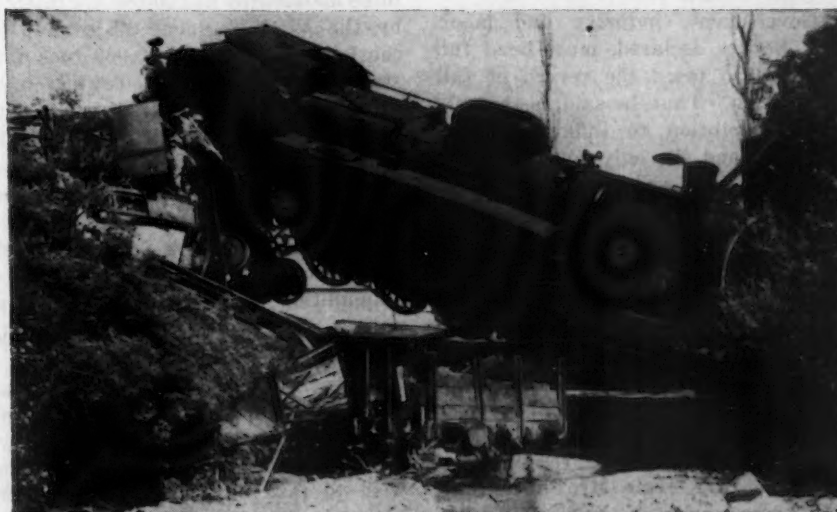
10. Possible unemployment must not be allowed to weaken confidence and curtail expansion. Reasonable unemployment compensation, with no discrimination against government workers, and a program of necessary public works should be put into operation.

### To Display Postwar Products

#### Chicago

• • • New products which will go on the market in the immediate postwar period will be displayed at an exposition here early in 1945 under the sponsorship of the National Congress for the Presentation of Products of Tomorrow. The purpose of the exhibit will be to make the public conscious of products which have been originated during the war period or whose development has received strong impetus. Included will be new wares in the plastic and synthetic fields, deep freeze units, dehydrated and packaged foods processed like those now being used on the fighting fronts, and new medicines. A large part of the exposition will be devoted to the widely changed types of home appliances that are now being developed. The show will be held in the Chicago Coliseum, vacated early this year by the Army Air Forces.

**BRIDGE BLOCK:** An engineer of the U. S. Army places a dynamite charge in a French locomotive which is blocking repair work on the Chauranne River railroad bridge near Apres, France. Nazis blocked or demolished bridges whenever possible during retreat.



## OPA Contemplates Keeping Price Controls During Period of Reconversion

### Washington

••• Maintenance of price controls through the period of reconversion is contemplated by OPA. Reconversion will be completed and price controls will be discontinued when pressures for high prices no longer exist.

This plan, shared widely by both industry and labor, was outlined by OPA Administrator Chester Bowles in a radio broadcast on Sept. 14.

"When full civilian production is achieved, shortages will disappear and prices will stabilize of their own accord," said Mr. Bowles. "Price controls having done their full wartime job will be safely removed. We in OPA, like all of you in business, in farming, in homes throughout the country, are looking forward to the day when all war-time emergency controls are behind us and our future—a glorious, secure progressive future—stretches ahead."

Mr. Bowles cited the record after the Armistice in November, 1918, to support his contention that price control should be continued until reconversion and full production are achieved. Mr. Bowles pointed out that immediately after the Armistice all attempts at price control were dropped, prices went down for a short time, then skyrocketed and then collapsed in 1920, the country headed for a serious depression.

The Administrator cautioned against a repetition of that experience. It will be necessary, Mr. Bowles said, to prevent a rise in wholesale prices, in farm prices, or soaring costs of raw materials from which civilian goods will be produced.

Government, industry and labor, Mr. Bowles declared, must bend full energies to speed the return of full production. That, he said, is the only lasting solution to inflation or to deflation and the only course to provide good jobs and a "decent, secure standard of living for us all."

The Price Control Act provides for expiration on June 30, 1945, but if the war has not ended or reconversion has not been completed by then it is expected that it will be continued.

Prices of civilian goods that have been out of production for almost three years will be pegged as nearly as possible during the reconversion period at 1942 levels, Mr. Bowles said at a press conference held subsequent

to his broadcast. Mr. Bowles referred to such items as automobiles, washing machines, refrigerators, heating equipment and radios.

"Our effort will be to get back to the 1942 level of prices as far as possible," Mr. Bowles said. "That may be achieved in large measure because there has been little increase in the cost of materials while production techniques have been greatly improved by war experience. Our volume rests upon volume production at low levels."

He did not discuss the effect on costs of these civilian items that would result from the probable increase in wages for producing materials they are made from such as steel, whose prices were frozen as of April 6, 1941. One contention made, however, is that even if steel wages are increased, elimination of overtime

pay will mean lower costs. This in effect is the WLB attitude.

Conferences soon will be begun with industries which will resume production of civilian goods, Mr. Bowles said. On minor items, he explained, such as "egg beaters and other gadgets" OPA will give free reign to producers in setting their own prices.

The OPA administrator said that goods to be produced again probably do not account for much more than six per cent of total national purchases and therefore he expressed confidence that prices can be controlled and inflation prevented.

He listed the following values of principal items to be made upon the collapse of Germany:

Automobiles and parts, \$3,300,000,000; refrigerators, sewing machines and washing machines, \$640,000,000; vacuum cleaners and appliances, \$260,000,000; radios, pianos, etc., \$560,000,000; heating and cooling equipment, \$650,000,000, and clocks and watches, \$270,000,000.

## WPB Allots 175,000 Tons of Steel

### Washington

••• Proving how close the end of the war in Europe may be, the WPB Requirements Committee with Army and Navy consent last week allotted an additional 175,000 tons of steel for civilian use in the fourth quarter.

While this gesture may be nullified by the collapse of Germany and plenty of order openings because of cutbacks, it puts meaning into the board's previous approval of the spot authorization procedure by providing a small amount of material.

The tonnage is divided into 100,000 tons of carbon and 25,000 tons of alloy to be distributed in 100-ton allotments by the WPB regional offices and a contingent reserve of 50,000 tons for starting production of sewing machines, stokers and refrigerators and 16 other items being programmed by the Office of Civilian Requirements.

The reason WPB was able to do it is that the Army has returned allotments because orders for shell steel were resulting in more inventory than ammunition makers could currently put in process, said Sam Anderson, WPB Program Bureau head.

A reserve of 57,500,000 lb. of aluminum and 15,000,000 lb. of copper has been setup for allocation by regional offices to manufacturers who wish to take advantage of the spot authorization procedure.

WPB Chairman J. A. Krug at his weekly press conference said last Thursday that 1106 applications had been received by regional offices for permission to resume civilian production up to Sept. 7. About 30 applications have been approved and the same number denied.

Stating that the steel reserve is largely for small plants, Mr. Krug ruled that applications for more than 100 tons would have to be referred to Washington.

In the determination of allotments the following preferences in order of importance will be used as a guide:

1. All applications which are certified by SWPC as hardship cases.
2. Applications from plants employing fewer than 250 wage earners.
3. Applications for authorization to produce OCR preferred products.
4. Applications indicating ability to use large quantities of surplus materials with "fill in" amounts of new materials, or facilities immediately available for utilization of new materials, or provision for employing a large number of workers.

Mr. Krug said that X-Day procedure would be put into effect despite the fact that isolated groups of Nazis fight on after most of the German armies have given up. When this will be, he declared, he had no way of knowing, but said that the plan was ready to be put into effect "tomor-



row," if Germany were beaten then.

A band of civilian ratings for use in reconversion may not be necessary despite this announcement by War Mobilizer Byrnes, it was said. WPB is studying the regional impact of cut-backs and Mr. Krug said that he hopes that there will be no labor shortages areas where it will be necessary to retain manpower controls.

### Producers Must File Monthly on Rated And Nonrated "A" Shipments Washington

• • • Producers of equipment subject to any WPB order on List A of the Priorities Regulation 24 must file Form WPB-3940 monthly in accordance with the instructions on that form, showing the quantity of their rated and unrated shipments, WPB announced last week.

List A contains those WPB regulations having restrictions on the placement of filling of unrated orders which are overridden by provisions of PR 24, issued Aug. 28. They are E-1-b, machine tools; E-9, precision measuring instruments; E-11, foundry equipment; L-89, elevators and escalators; L-123, general industrial equipment; L-193, conveying machinery; L-221, electric motors; L-226, printing trades machinery; L-250, electric motor controllers; L-268, oxy-acetylene apparatus; L-287, portable conveyors; L-298, welding equipment; L-331, logging and lumber machinery; L-314, lubrication equipment; and L-332, container machinery.

However, if the dollar value of a producer's monthly shipments of unrated orders does not exceed 10 per cent of his total shipments, he need not file his report, WPB said in amending PR-24. Such a producer must keep unrated orders placed under PR-24 filed so they can be readily segregated and examined, WPB pointed out.

### August Steel Production

• • • Steel production in August was maintained at 94.1 per cent of capacity compared with 94.4 per cent in July. From a tonnage standpoint, August output amounted to 7,469,800 net tons compared with 7,474,297 in July. Open hearth steel output in August 6,691,262 or 96 per cent of capacity. Output of Bessemer steel in August was 429,637 net tons or 83.5 per cent of capacity; while electric steel in August amounted to 348,901 net tons or 77 per cent of capacity.

## Industrial Briefs . . .

• **PLANT OPENED** — Square D Co., Detroit, has announced the opening of a new manufacturing plant and warehouse located at 2310 Ranier Avenue, Seattle.

• **GROUNDS PURCHASED** — General Electric Co. has purchased a 155-acre plot of ground in Liverpool, N. Y., and plans to build a new plant and make it the headquarters for the company's electronics department.

• **CONTRACT COMPLETED** — Meehanite Metal Corp., New Rochelle, N. Y., has announced that through their London office a contract for the manufacture of Meehanite castings has been completed with the Jay Engineering Works Ltd., Parganas, India.

• **CORPORATE NAME CHANGED** — Acme Pattern & Tool Co., Dayton, Ohio, has changed its corporate name to Acme Aluminum Alloys, Inc., because of the tremendous growth in production of aluminum castings.

• **SUBSIDIARY ACQUIRED** — Metal Fusion Corp. of America has become a subsidiary of Cook Electric Co.

• **NEW BRANCH** — Aluminum Co. of America has opened a branch office at 1320 First National Building, Birmingham. H. A. Lilly is in charge.

• **CHANGES ADDRESS** — Formcraft Tool Co. has changed its address to 4500 Oakman Boulevard, Detroit.

• **NEW QUARTERS** — Sutton Tool Co., Detroit, has moved the company's offices and entire manufacturing plant to Sturgis, Mich.

• **NEW DEPARTMENT** — Pennsylvania Salt Mfg. Co., Philadelphia, has organized an export department at the company's main office in Philadelphia. John H. S. Barr has been made manager.

• **PLANT PURCHASED** — Allis-Chalmers Mfg. Co. has purchased the government-owned American Radiator plant in Springfield, Ill. The radiator plant was erected after World War I by Montgomery Ward & Co.

• **STOCK AND DISTRIBUTION** — Herrick Co., Boston, will stock and distribute Fairmont Aluminum Co.'s products in Boston, and Vincent Brass & Copper Co., Inc., Minneapolis, will do likewise in the city of Minneapolis.

• **FIRST PRIZE** — National Screw Machine Products Association, Cleveland, has been awarded first prize in the American Trade Association Executives 1944 award, the annual competition for outstanding achievement and service to the industry.

• **TO REPRESENT** — George Gorton Machine Co., Racine, Wis., has appointed Russel, Holbrook & Henderson, Inc., New York, as exclusive representatives in the New England territory.

• **CHANGE OF NAME** — Armstrong Foundry Co., Racine, Wis., has changed its name to the Haas Foundry Co.

• **BUYS COMPANY** — Fairbanks, Morse & Co., Chicago, has purchased the Pomona Pump Co., a division of Joshua Hendy Iron Works.

• **LARGER HEADQUARTERS** — Ilg Electric Ventilating Co. has moved its San Francisco branch office to larger headquarters at 826 Sharon Building.

• **RECORD SET** — Weirton Steel Co., for the second time this year, has set a new monthly production record on the company's 48-in. continuous hot mill, which was the first completely continuous mill to be placed in operation anywhere in the world.

## War Plant Gives Demonstration of Gyroscopic Tank-Gun Stabilizer

### Springfield, Mass.

••• The celophane wrappings of secrecy were peeled from another "military secret" recently when Clinton R. Hanna, Westinghouse research engineer, described and demonstrated the gyroscopic tank-gun stabilizer, a device widely used in Allied armored units, at the Westinghouse Electric & Mfg. Co. plant here.

According to Mr. Hanna, inventor of the device, use of the gyro-stabilizer gives American tankmen a decisive offensive advantage over tanks of the enemy because it holds the gun in its aimed position despite the pitching and rolling of the tank.

"Until the Army adopted the stabilizer," the inventor said, "it was accepted military form for half of a group of tanks to stop and fire, then advance while the other half stopped. Under this system only half of the guns could fire at one time. This was true of all tanks, whether they were the enemy's or the Allies' armor. It was necessary for the tanks to halt because they could not fire accurately while in motion."

Such awkward "stop and go" tactics have been entirely eliminated by the use of the gyro-stabilizer which holds the tank-gun on the target even if the tank is slamming into gullies and shell holes or climbing hills.

As now used in American tanks, this is the way the device works:

A piston in a cylinder attached to the breech of the tank's gun moves up and down to stabilize the movement of the gun. The piston is moved by oil under only 200 lb. pressure, which is fed through two lines—one to the top and one to the bottom of the piston, from two small gear pumps. The amount of oil fed to either side of the piston is controlled by two magnetic "teeter bar" valves. When one opens, the other closes.

An ingenious gadget, called the Silverstat, varies the voltage supplied each magnet, and so varies the oil flow to top and bottom of the cylinder. The Silverstat is made up of two sets of thin, evenly spaced leaves of phosphor bronze, each with a "button" of silver at one end for electrical contact. Compressing the stack "shorts" successive taps on resistors.

A gyroscope is attached to the

GYRO-STABILIZER: At Springfield, Mass., C. R. Hanna, Westinghouse research engineer and inventor of the gyroscopic tank-gun stabilizer, demonstrates the ingenious device to a press gathering at the Westinghouse Electric & Mfg. plant.



breech of the gun where this rotational direction is subject to violent change very time the tank rolls over a rock or pitches into a ditch. At the first sign of such a jolt of the gun, the gyro asserts itself to comply with the law governing its motion. In resisting the downward or upward jerk of the gun barrel, its own axle rotates at right angles to the up or down movement, and in effect "waggles" the gyro by compressing the Silverstat leaves on either side of neutral. The gyro reacts to the speed at which the tank would ordinarily pitch, and

hence anticipates any motion tending to take the barrel off the target.

To demonstrate the gyro-stabilizer in action, an M-5a2 tank was used on a test run. Observers were allowed to ride in the tank during the demonstration after being warned "to keep their knees in or they might be cut off."

Test runs showed in practice what Westinghouse engineers had explained in theory with civilian observers operating the stabilizer and who, in most cases, kept the 37 mm gun "on the target" with little difficulty.

## Steel Distributors Stock Rules Changed

### Washington

••• WPB announced last week that steel distributors may now apply for permission to deliver any off-grade, rejected steel or idle or excess inventory which they have been unable to move from their stock under CMP regulations. Deliveries may be made to any person who has an approved end-use, but who is not in a position to furnish a CMP allotment number or symbol with his order.

WPB issued Direction 3 to CMP Regulation 4, effective Sept. 13, to provide additional assistance to such distributors for the disposal of surplus and obsolete stocks of alloy steel in the NE-9400 series. The direction provides:

1. Any person who has received an allotment of carbon steel may

use that allotment to purchase alloy steel in the NE-9400 series from any distributor's stock, but this substitution may not be made when ordering from a producer.

2. Any steel distributor operating under Order M-21-b-1 (steel warehousing order) who has an inventory of alloy steel in the NE-9400 series on hand or in transit to his stock on the effective date of this direction may offer and deliver, subject to the approval of his customer, any such steel on any order that he is permitted to fill under CMP Regulation 4 which calls for the delivery of carbon steel. Any such delivery may be used by the distributor to support a stock replacement order for any general steel product in the manner authorized by Order M-21-b-1.



## Engineering Executive Discusses Postwar Machine Tool Distribution

By GEO. T. TRUNDLE, JR.  
President, Trundle Engineering Co.,  
Cleveland, Ohio

### Cleveland

• • • When the war is over, there is bound to be a tremendous reshuffling of the ownership of existing machine tools—along with, in my opinion, a substantial demand for new machine tools.

This picture involves present machine tools owned by the government, present machine tools owned by industry and new machine tools to be made by machine tool builders.

Here are three distinct but related sources of supply, and they cannot be considered as independent factors.

Machine tools for sale are going to the market, whether the seller is the government, the private owner or the builder. The question is: Just how can they best go to market?

Before the war, the major share of the machine tools distributed in this country were sold by direct sales representatives of machine tool builders, but that was a comparatively recent trend. For many years, most of the nation's machine tool output was sold through machine tool dealers. And of course today, with the government owning such a large share of the nation's supply of machine tools, there arises the question as to whether government should enter directly into machine tool distribution.

Before we attempt an answer to this question, suppose we analyze, in a general way, the nation's postwar machine tool supply.

Let's start with existing machine tools that will come on the market after the war—whether owned by government or by private industry. These will fall into three general classifications:

1. Machine tools headed, in the main, for the junk pile. These will be the old machines that were on plant floors years before the war started, that have remained in use throughout the war because of urgent production needs, and which, because they are worn out or obsolete, will have no proper place in the postwar competitive picture.

2. Machine tools that are worth continuing in service but in need of reconditioning. These will consist partly of pre-war machine tools, and partly of machine tools built during the war period that have been subjected to extreme punishment.

3. The third classification—and by far the most important—consists of machine tools, built for war, that will not require reconditioning when the war ends and

are in excellent shape to go to work on postwar jobs tomorrow morning.

Of course a number of these new first-class war-built machine tools are special-purpose machines, made for war purposes, for which there is no counterpart in peacetime production. Such machines, in my opinion, should be warehoused by the Government as stand-by equipment in event of possible future war, but they represent only a small per cent of the total.

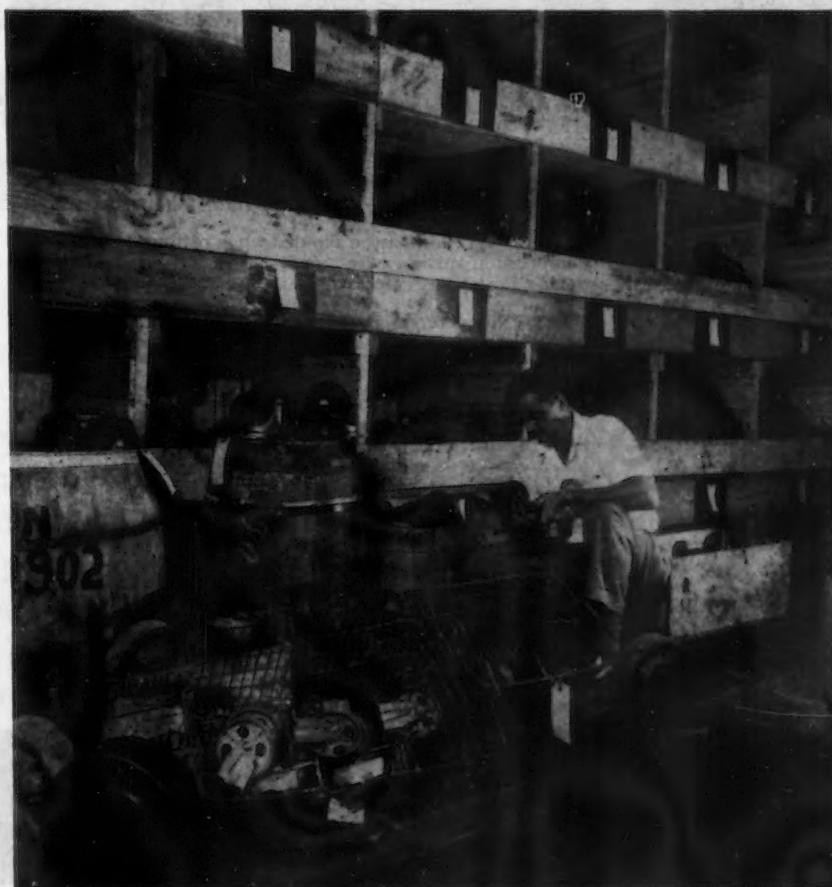
When it is realized that since Pearl Harbor the machine tool industry has built more machine tools than normally could possibly have been required in 10 years of peacetime economy, that most of these machine tools have stayed in the United States and are readily applicable to peacetime

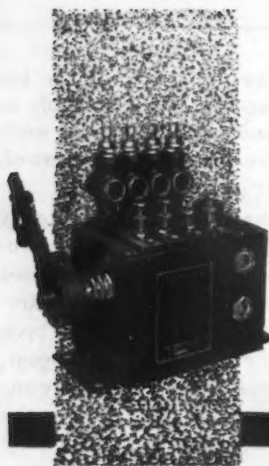
work, it is obvious that it is the big supply of war-built machine tools in good shape and ready for other work with which we are chiefly concerned, postwar.

But these machines as located today—distributed on the basis of war production needs—must be redistributed to fit our postwar production requirements. One machine tool that has been perfect for the war job of the company that owns it may fit that company's postwar program while the machine tool standing next to it may not fit that company's postwar program in the least. The latter may be in first-class condition, but if there is no use for it postwar in that plant, it must go some place else. It would seem that after the war practically every company is going to want to get rid of some of the machine tools it has now and buy other and different machine tools that it needs.

With that background—what is the best distribution setup whereby the average company can fulfill its postwar requirements—the direct sales office of the machine tool builder or

**CASTER STOCKPILE:** An inspector examines an item in the Glenn L. Martin Co.'s \$20,000 stockpile of steel casters at Baltimore, Md. More than 2000 usable casters are reserved here, including flat, grooved, steel and rubber wheels of various sizes.



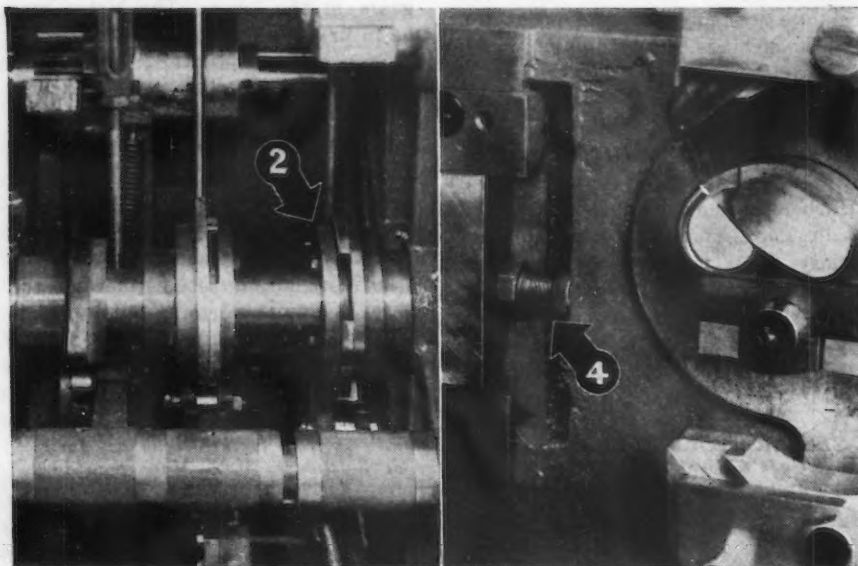


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- 2 Use the diameter mechanism with barrel spring cams set up to reduce both ends. The diameter stop screw will nullify the cam action on all but the end coils.
- 3 In making certain springs, end reducing cams of equal height will result in one end coil of the spring being larger than the other. This is a characteristic of all spring coilers, but it can be overcome by making one cam slightly higher (of larger diameter) than its mate.
- 4 Greater precision can be had by using standard cams of identical height in conjunction with a stop screw controlling the forward movement of the coiling point toward the arbor. The stop screw is placed between the diameter slide and the housing, and ensures identical ends on each spring. However, since the stop screw opposes the cam action, breakage is possible unless the adjustment is very nearly correct before applying power to the coiler.

October 19th—Preventive Maintenance



**THE TORRINGTON**  
MANUFACTURING COMPANY  
TORRINGTON, CONNECTICUT

the machine tool dealer? And what part should the government play in postwar machine tool distribution?

My answer to that question goes far back into prewar history.

Over a period of a good many years our company, as a management engineering concern, has been directly interested in the machine tool buying programs of hundreds of industrial concerns.

On the basis of that experience, we can evaluate rather accurately the situation of the company winding up its war contracts and getting ready to get back to its peacetime product.

Such a company surveys its machine tool equipment and sets up a budget as to the amount of money it can spend for improvements and replacements as it enters the postwar field. It no doubt will have quite a few old machines that it is sure it will not want to keep. Just the same, it will want to get out of these old machines all the turn-in value it possibly can.

This company knows it cannot afford to reequip with entirely new machines. It can buy some new ones (from war surpluses or from builders); it can buy some reconditioned ones and it may have to buy some machines "as is," in whatever shape they have been left after the war. There are limits to the budget.

Now if this company tries to deal entirely with sales representatives of machine tool builders, it finds itself conducting many negotiations with a lot of different sales offices. And each machine tool builder's sales agent looks at the picture only with respect to his particular make of machine tools and his own particular company.

But if the company in question works out its postwar machine tool problem with a machine tool dealer, the company's situation can be studied, not piecemeal, but as a single machine tool engineering project. Instead of 10 to 20 different machine tool companies' salesmen bothering about their respective possible orders, the dealer, looking at the picture from an over-all basis, will be able to work out a balanced plan of plant rehabilitation.

This dealer will have on his floor—or know where he can get—a wide variety of machine tools. Because of his current transactions with other customers, he will be in a good position to take in various types of machine tools on a trade-in basis. The sales agent of the machine tool builder cannot, as a rule, take in on a trade-in basis any old machine tools except



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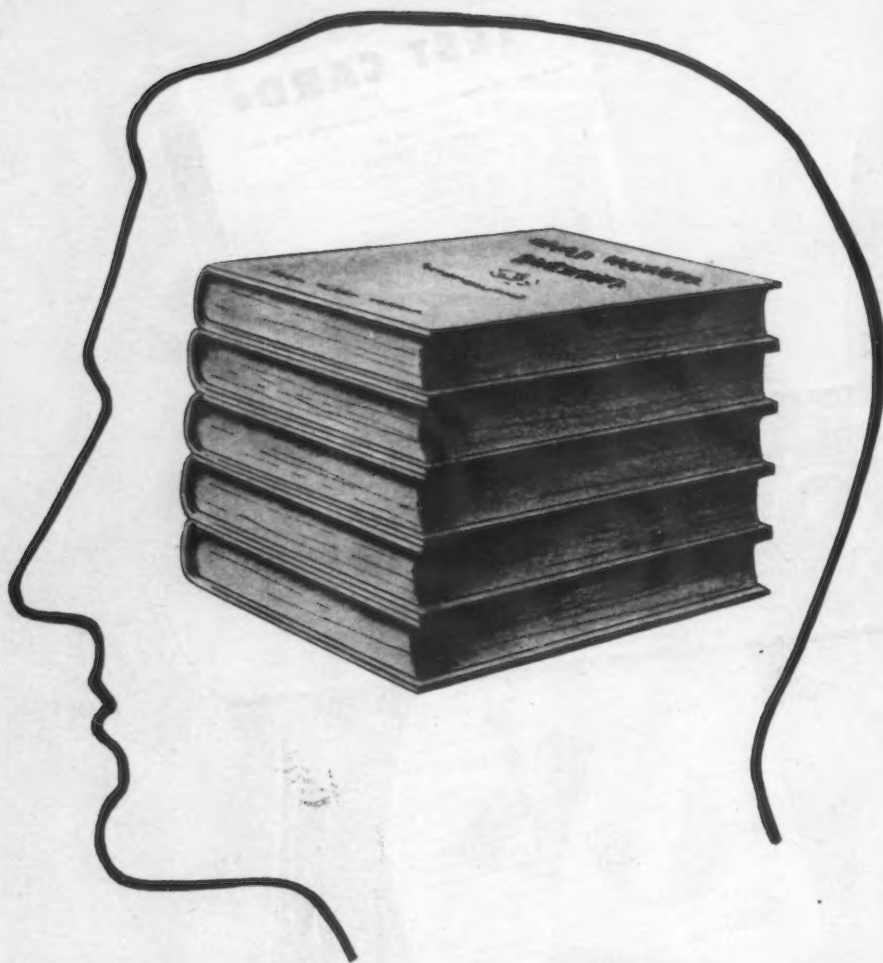
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those of the make which he represents.

The fact is that the sales office of the machine tool builder simply is not geared up to facilitate the interchange of machine tools which would appear to be an essential part of postwar adjustment.

For instance — suppose Company "A" has three planers it needed for its war job but which it doesn't need for its peacetime job. At the same time, Company "B" may need three planers for its peacetime work that it didn't need for its war job. What can the sales agent of the machine tool builder do about a situation like that? Isn't the machine tool dealer the logical clearing house for such interchange?

The machine tool dealer has a sales organization that is accustomed to handle trade-ins, to deal with used as well as new machine tools, to think in terms of a wide variety of machines and to perform a sales engineering job not merely for one type of work in a customer's plant but for that plant as a whole. And when we look at the postwar machine tool picture with the interchange of machine tool ownership which is inevitably ahead, it would seem to me that the machine tool dealers represent the most effective sales and distribution outlets.

Now of course the government and the machine tool builders are inevitably in this picture in a big way and no intelligent program can be worked out without their cooperation.

I would suggest that after segregating special-purpose standby war equipment, the government should let companies running government-owned plants buy such machine tools in those plants as they want to keep postwar.

Machine tool builders should be interested in acquiring machine tools of their own make which require reconditioning, for the purpose of giving work to their employees and insuring that their machine tools stand up commensurate with their reputation. By doing this, they will also protect their normal distribution channels.

Now as to the remainder—which will still bulk large. Here let us consider primary objectives. On the one hand, we want maximum employment and productivity and on the other, we want to make sure that government-owned machine tools are sold to private buyers, postwar, on a basis whereby the taxpayer who paid for these machine tools will recover a proper share of his money.

To achieve these ends, it is necessary



# STOPS A \$4311 DRIP

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**Stays on Gears . . . Saved 41,400 Pounds of Grease in 18 Months**

The open gears of machines present an important lubrication problem in any plant. Whenever the floor requires frequent cleanings because of grease and oil accumulations, it is a sure sign that the lubricants being used are not suitable for the job. This was exactly the condition discovered by a Sun Engineer in a large eastern paper mill.

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**Only one greasing instead of 14** was required in each two weeks' operation. This not only saved a large amount of grease but also greatly reduced the manhours for application. The housecleaning condition on the

drive side of the machine improved 100% . . . saving many more manhours. After 18 months' use, here are the facts revealed by company-kept records:

**41,400 pounds of grease were saved** in this period. The dollar saving for lubricant alone was \$2571.00. The saving in labor was estimated at \$1740. A total saving of \$4311! All this . . . plus conservation of valuable time and manpower.

This is another instance of the dollars and cents value of Sun's service to all types of Industry . . . a combination of sound engineering and a complete line of specialized lubricants. Another Sun service is the recently-published lubrication manual, "How To Get The Most Out of Lubricants." A copy is yours for the asking . . . as are the services of a Sun Engineer. . . Just write to . . .

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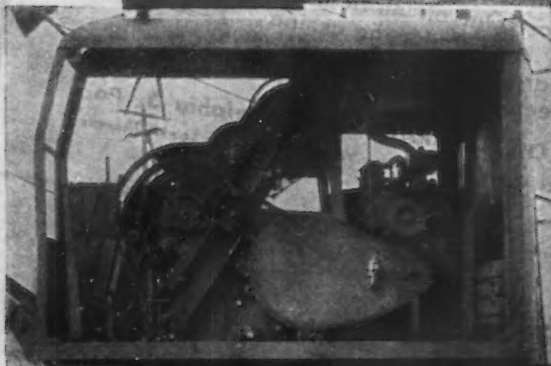
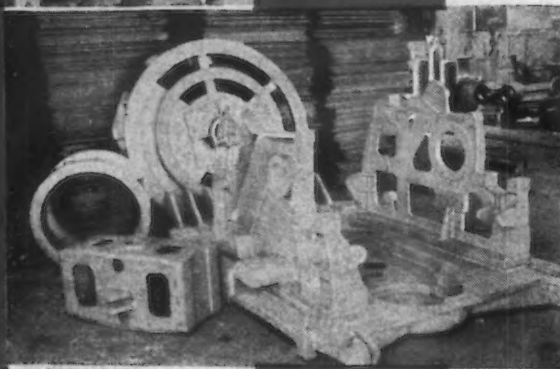
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sary that postwar machine tool distribution be handled in an orderly fashion, by reputable people in the trade, who know their business.

At the end of the last war, government machine tool surpluses were sold indiscriminately at ridiculous prices to junk dealers and speculators. The result was the taxpayers got next to nothing, the machine tools were not handled by people who knew how to put them in shape for postwar jobs. The buyer had no way of knowing what he was getting, because no reputable name or organization stood behind the seller.

Let's not make the same mistake this time. Remember that what we are reaching for is a postwar machine tool distribution that will be effective and efficient, and enable us to accomplish a complete rearrangement of machine tool ownership in this country to the mutual benefit of all concerned.

In order to do this, we must rely upon people who are not speculators, but sound businessmen in a specialized field, with a standing and reputation behind them and a desire to perpetuate that standing and reputation in the future. We must rely upon people who don't sell machine tools by the pound, but sell them upon the basis of the work they can do, in relationship to the job which has to be done.

So—going back to the prewar experience of our own company, as mentioned before—the conclusion is again arrived at that the machine tool dealer, working in cooperation with government on the one hand and the machine tool builder on the other, represents the best bet for the proper distribution of machine tools. To my mind, he has had, in past years, the type of experience which makes him particularly fitted to do this job.

### WLB Settles Cases Affecting Five Forge Shops and Foundries Chicago

• • • Disputes over vacation terms have been settled by the Sixth Regional War Labor Board in cases affecting five forge shops and foundries. Firms affected are Pettibone-Mullikin Corp., Chicago; Rockford Drop Forge Co., Rockford, Ill.; Clifford Jacobs Forging Co., Champaign, Ill.; Interstate Drop Forge Co., Milwaukee; and American Car & Foundry Co.

With the exception of the Rockford firm, the board ordered one week's vacation for employees with one year's service and two weeks for employees with five years or more.



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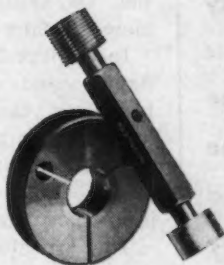


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## New Digest Shows Postwar Planning Of Aircraft Groups

### New York

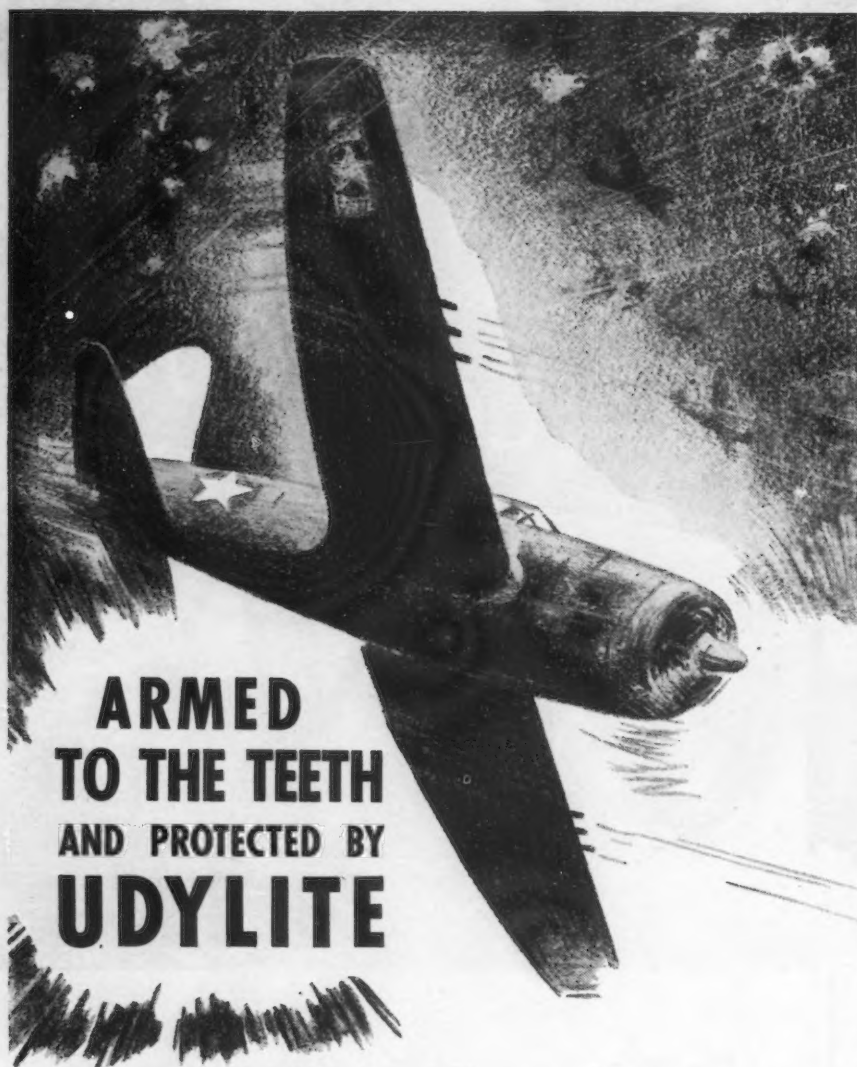
• • • A conservative but optimistic picture of the postwar developments in the aviation industry is presented in a digest of authoritative predictions recently made by aviation leaders concerning the industry's probable future course, just published by Simmonds Aerocessories, Inc. Intended for the guidance of this concern's executives in their postwar planning, the publication is also being distributed to a selected list of aviation and other business executives.

As stated in the brochure's frank foreword written by Reginald M. Cleveland, any conclusions must be based upon conjecture; but as the individuals quoted are the most authoritative and best informed specialists in all branches of aviation, and as their considered opinions, independently expressed, show a remarkable unanimity, their collective optimism in respect of aviation's future seems founded on a reasonable basis.

Compiled for Simmonds by Aviation Research Associates, the publication digests the publicly expressed thoughts of the heads of the largest airplane manufacturing companies, the country's leading aeronautical engineers, prominent aircraft transport authorities, leading aircraft research directors, statisticians specializing in aircraft production, government officials in the Civil Aeronautics Administration, Army Air Forces, the Navy Department, officials of the National Resources Planning Board, and the Aeronautical Chamber of Commerce, among others.

In addition, the inclusion of facts, figures and comments on aviation trends of the presidents of public utility organizations and others who, in a sense, are aviation's competitors, lends balance to the weight of the predictions presented in the brochure.

The probable number of privately owned planes in the postwar period, the likely cost of such planes in relation to the average American income, what the prevailing types of planes will be, predictions as to the future of the helicopter, production costs on the basis of dollars and cents per pound-weight of plane, future mechanical developments in aeronautics with special reference to safety factors, frank predictions on the handicaps that private flying must face and suggestions for overcoming



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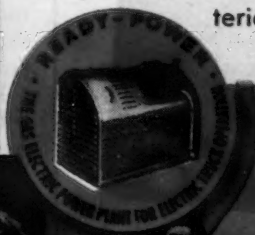
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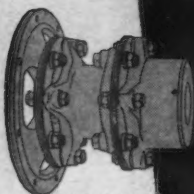
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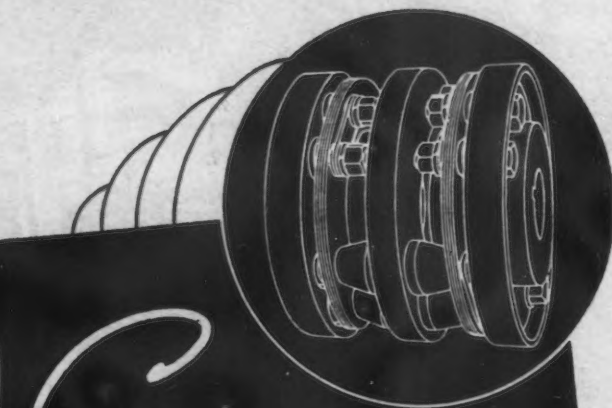
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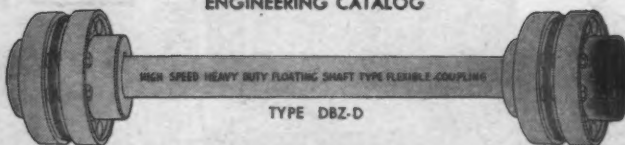


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## NEWS OF INDUSTRY

them, the tie-in between bus-lines and air-lines, the speed of future planes, future cargo transport together with a detailed study of carrier costs and freight rates, the probable extent to which military planes will be converted to peacetime uses, future fuel costs, the place the glider will occupy, surface competition, jet propulsion, and future military aviation needs are some of the subjects touched upon.

### "Jeep" Fire-Fighter Effective in Tests At Willys-Overland

#### Toledo

... A fire-fighter "jeep"—designed to protect industrial plants and to serve as an auxiliary unit for urban and rural fire companies—has qualified for a place in America's postwar safety plans during 18 months of experimental service here.

The new unit was developed by engineers at Willys-Overland Motors from an early test model of the jeep, according to S. E. Gregorek, fire protection chief for the company, who said it has been patrolling the auto plant's more than two million sq. ft. of floor space since January, 1943.

During exhaustive tests, he explained, the "blaze-blitzing" jeep has answered 34 emergency alarms, bringing all fires under control before any serious damage was done.

Describing the jeep as "the most compact fire-fighting unit ever developed," Mr. Gregorek said the vehicle has been driven on elevators and carried to every section of the plant from the basement to the roof. In other instances, it has climbed stairs, raced up inclines and coasted down chutes in transporting its three-man crew to areas of trouble.

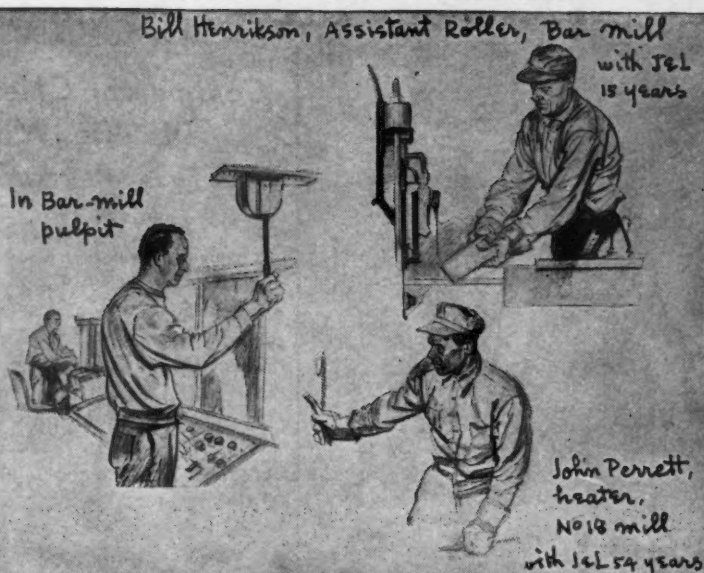
Painted a bright red and outfitted with shiny brass and copper accessories, the jeep is equipped with 350 ft. of 2½ in. hose; two nozzles; two extinguishers; a 500-gal. per min. pump; and two lengths of suction hose, the latter to draw water from reservoirs, creeks and sewers.

Discussing its postwar application, Gregorek pointed out that in larger cities the jeep will be able to get to a fire and hold the blaze under control until the heavier and less maneuverable units arrive. He said the unit should prove a boon to small communities which cannot afford larger equipment.

He predicted that the new fire-fighter will come into wide use after the war in combating forest fires, since "it's disdain for roads already has made military history."



(Advertisement)



## ROLLING STEEL FOR WAR YET READY FOR PEACE

Watching the white-hot bars of steel run the course of this modern continuous bar mill—going faster and faster, growing longer and longer—stimulates pride in war steel production in America and gives assurance of an abundance of steel for use in a world at peace.

For this unique J&L bar mill—as well as other bar mills throughout the industry—is as adaptable as steel itself; the strongest, most versatile metal. Without change of pace, the rhythm of its rolling took up the song of steel in battle: steel for planes, tanks, shells, ships and guns.

At war's end these mills will keep on rolling steel—without pause for conversion—steel bars for automobiles, for railroads, for industry, for farms—new and better steels for daily living and employment.

**JONES & LAUGHLIN  
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CONTROLLED QUALITY STEEL FOR WAR



## STEEL MILL MUSIC

Steel mill music is a thunderous, rumbling of overtones and undertones in a big, modern rolling mill that blend into a roaring symphony. To a visitor, it is just a deafening noise, but to the skilled crews that operate the mill it has a definite rhythm. If the workmen at their posts hear the faintest dissonance, each man is instantly alert to find out quickly what is causing the discord, as it may signal something amiss. Ears trained by years of listening to steel mill music can spot an off-beat in the great rhythmic noise as quickly as a conductor can spot one in a big orchestra.

World record for steel bars from any bar mill, 44,125 tons in one month, was rolled on the Jones & Laughlin No. 18 mill (see illustration) in January this year, a tribute to highly skilled workmen who operate it, and to J&L engineers who in 1931 pioneered in designing the new type mill.

A deep rose-red glow illuminates rolls, men and interior of this unique J&L 14-inch bar mill as red-hot billets being rolled into rounds, flats, hexagons, squares and special shapes speed through several stands of rolls on their way up and down and across the mill's great expanse (large enough to cover five football fields). This mill is so vast that as many as twelve steel sections are in process at one time—totaling at finish as long as  $\frac{1}{2}$  mile—and so fast that time from billet to finished bar is less than two minutes.

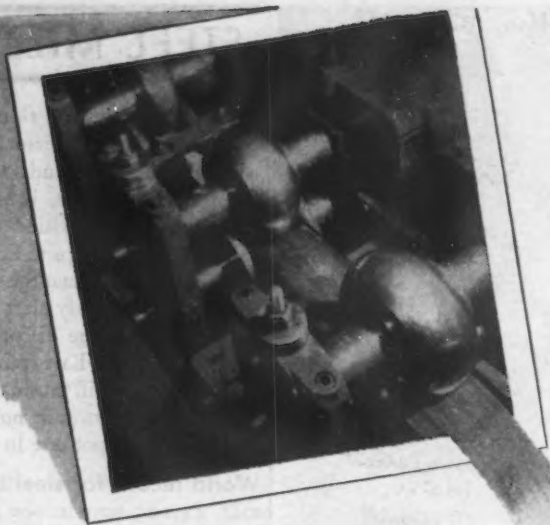
Iron works on a flat boat is what the astonished citizenry along the Monongahela River in 1850 saw being pushed by a steamboat down the 60 miles from Brownsville to Pittsburgh. The iron works belonged to twenty-six year old B. F. Jones. He had purchased the plant with his earnings as a partner in a canal boat freight service. Young Jones dismantled his furnaces and mill and transported them to Pittsburgh, foreseeing the development there. This was the beginning of the Jones & Laughlin Steel Corporation, today fourth largest steel producer.

Conestoga freight wagons, and canal boats transported to eastern markets the puddled iron bars, flats, plates, shapes, bands, cold rolled iron bars, and cut nails that in the 1850's were the pioneers of a long line of J&L products to follow.

Stoutly Dutch-built in a valley in eastern Pennsylvania once occupied by Conestoga Indians, the blue and red Conestoga wagons with rakish, overshot canvas tops, were pulled across the rugged trails of the Alleghenies by 4- and 6-horse teams hauling freight.

Stogies, a popular smoke to this day in the Pittsburgh district, were long, thin, black cigars brought west from tobacco plantations in eastern Pennsylvania by Conestoga wagon drivers, who hauled back iron products. These stout smokes were called "Conestogie" cigars, soon shortened to stogies.

COPYRIGHT 1944—JONES & LAUGHLIN STEEL CORPORATION



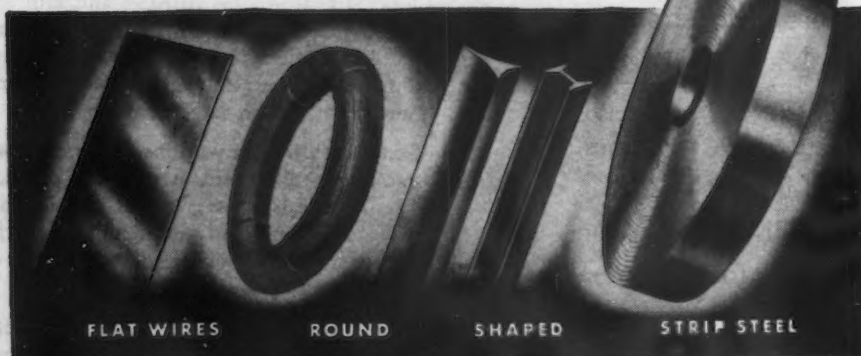
## ...ALWAYS *Good Form* IN THE FORMING ROLLS!

ROEBLING STRIP STEEL quality shows good form at the point where it counts the most . . . final fabrication!

Here specifications for steel analysis, dimensions and finish face the acid test—and that's where Roebling Strip Steel pays off in faster production . . . fewer rejects . . . less machine maintenance.

Whether you need round, flat or shaped wire . . . for coiling springs, punching, drawing or forming . . . you can share the "know how" gained in 100 year's of wire specialization by specifying "Roebling". Send us complete information and specifications for prompt action on how we can serve you . . . help you save money.

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FLAT WIRES

ROUND

SHAPED

STRIP STEEL



# ROEBLING

PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • AERIAL WIRE ROPE SYSTEMS • COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • SUSPENSION BRIDGES AND CABLES

## NEWS OF INDUSTRY

### Continental Chief Discusses War To Peace Transition

#### New York

• • • Summarizing his views on Continental Can Co.'s employment situation after the war, Carle C. Conway, president and chairman of the board, recently sent a letter to some 50 plant managers throughout the country pointing out that the company probably will be able to maintain present employment levels without interruption during the transition from a war to peacetime economy.

"Continental's reconversion problems are very minor," he said, "and there is little likelihood that the company will have to reduce its present scale of operations or have difficulty maintaining its present volume of business, providing, of course, that government restrictions on the raw materials that we need are promptly lifted with the termination of hostilities."

In analyzing the employment situation division by division, Mr. Conway pointed out that the problem of reconversion is practically nonexistent in packers' can plants, which represent the largest single factor in Continental Can operations. General line plants may require some re-allocation of machinery and changes in assembly lines, but these undertakings will be gradual and result in relatively little loss of time. Prospects are that sales will rise to new heights as soon as Government orders can be completed and metal containers are again made available to former customers.

### Stran-Steel Active in Research Detroit

• • • Stran-Steel Div. of Great Lakes Steel Corp., engineers and fabricators of steel building and building products, and the John B. Pierce Foundation, New York, which has been active in research and development work in mass-produced, low-cost housing, have joined forces to enter actively the postwar housing field.

The Pierce Foundation is a privately endowed organization engaged in research, educational, technical and scientific work, giving particular attention to the pre-engineered house and its utilities, especially heating, ventilating and sanitary equipment. The foundation has designed many houses in connection with war projects. Stran-Steel is the sole manufacturer of Quonset huts for the Navy.



*Just Announced!*

# REVOLUTIONARY NEW "PHILCO THIRTY" GIVES 30% LONGER LIFE!



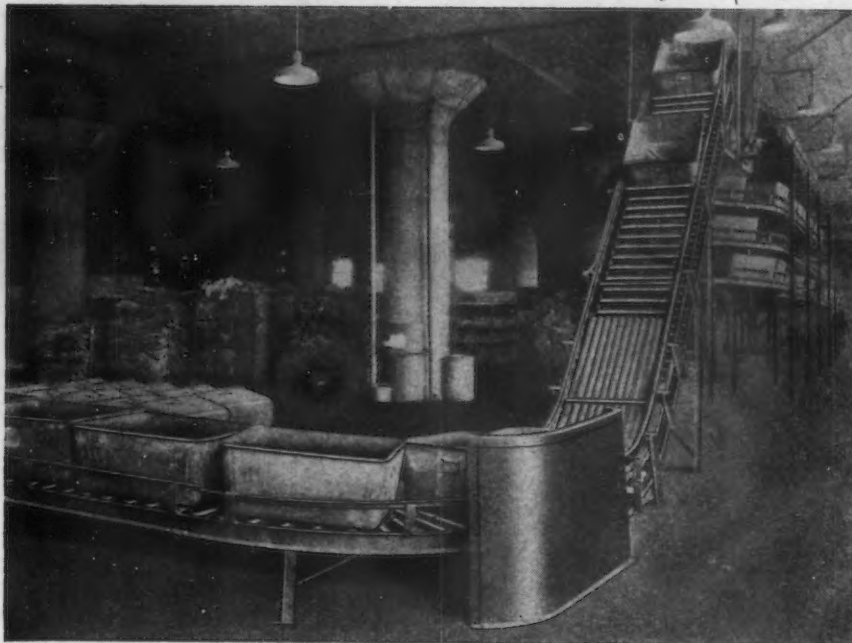
## Again... Philco Makes Engineering History

At last, a motive power battery with a revolutionary, new construction that actually gives you 30% longer life . . . and more! A brand new principle of fabricated insulation . . . developed after years of research in the Philco laboratories, and now introduced after exhaustive tests in actual service. It's the Philco "Thirty" . . . your post-war battery, available now in certain types and limited quantities. Write today for full information.

PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey

## PLANNING TO CHANGE YOUR PLANT LAYOUT FOR

# Reconversion?



## If You Need CONVEYORS That Can Give a "LIFT"... Ask STANDARD CONVEYOR!

**B**EFORE you decide on those changes—before you invest a cent of money—before a brick is laid or a nail driven—check your plan on the score of conveying and conveyors.

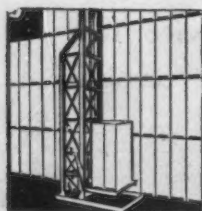
Conveyors can be built to do more than just carry in a horizontal plane. For example, push bar conveyors can carry and move packages and containers up a slope or incline at 30, 45, or 60 degree angles; vertical lift conveyors will carry commodities straight up and down to the height of several floors. These conveyors that lift and lower can be used individually or combined with a conveyor system to provide uninterrupted flow of commodities between floors.

Push bar conveyors and vertical lift conveyors are part of Standard Conveyor's wide variety of equipment—power and gravity conveyors in belt, roller, chain, and slat types; spiral

chutes, tiering machines, portable pilers, pneumatic tube systems.

It's well to remember that Standard Conveyor has been headquarters for conveyors for more than 40 years; we are qualified by long experience to recommend and build efficient equipment for any given installation. Write for catalog IA-94, "Conveyors by Standard"—a profusely illustrated reference book that will prove very useful to you.

**STANDARD CONVEYOR CO.**  
General Offices: North St. Paul 9, Minn.  
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**TIERING AND  
LIFTING MACHINES**



**PORTABLE  
PILERS**



**SPIRAL  
CHUTES**



**PNEUMATIC  
TUBE SYSTEMS**

## NEWS OF INDUSTRY

### Urge Practical Standards For Postwar Worker

#### Philadelphia

• • • A plan characterized by Louis B. F. Raycroft, coordinator of veteran personnel, Selective Service System, as "the only sensible approach to the employer's task of postwar veteran reinstatement" was presented at a recent meeting of the Advisory Council on Vocational Training for War Production Workers here.

The exponent of the plan, E. J. Ronan, former chief of the Manpower Utilization Division of the War Manpower Commission, now general manager of the industrial engineering firm of Associated Consultants, of Philadelphia, stated at the meeting that unless a concrete, practical set of standards is formulated in every plant now to care for ex-military personnel intending to return to their former jobs, new wounds for veterans and ill-will for industry will be postwar inevitabilities.

Ronan proposes job analyses by proved industrial engineering techniques, with special consideration of the physical requirements of each job, coordinating them with the physical capabilities of the veteran. His method provides also for the determination of seniority status in accordance with the individual company regulations, existing union contracts, and provisions of the Selective Service Law.

Ronan pointed out to the representatives of education, labor and industry who attended the meeting that the decision on "What Is Temporary and What Is Permanent Labor" is the basis for determining the re-employment rights of ex-servicemen.

From inquiries on reinstatement rights received by his firm, Ronan found that considerable confusion exists in the laymen's interpretation of the portion of the Selective Service Law covering Veteran Reemployment. At subsequent conferences in Washington with Selective Service officials on reinstatement rights, he learned that no classifications can be made until standards are set up to determine whether a man was a permanent employee, or a temporary employee before entering the service. The proper answer to this question will make the difference between orderly transition and disorganized chaos in industry, he concluded.

"The concept of employer cooperation must not be confined to press



**BUILT ON THE BASIS OF MECHANICAL SOUNDNESS**



Forging Machine dies and tools and progressive forging operations for producing pierced drive shaft flange. The punch slug sheared from the end of the bar after forging is the only waste.

## **AJAX FORGING MACHINES Maintain Leadership in Advanced Design and More Efficient, High Production Forging**

From the 2" to the 8" every Ajax Forging Machine is built embodying the sound mechanical features of a One Piece Solid Steel Bed Frame, a highly efficient, patented, Direct-acting Air Clutch, Continuous Crankshaft Housings, an under arm Extension Guided Header Slide, a Top Suspended Outboard Guided Die Slide, Cam Actuated Die Grip with Self-contained Automatic Safety and an Automatic Lubricating System.

Such sound mechanical features as these, built to

a highly advanced and thoroughly proven design, result in machines that are more efficient in this method of hot forming metal than any previously offered to industry.

The greater dependability, greater speed and higher degree of accuracy of Ajax Machines which are of such great advantage in the production of forgings for

war, will be the production advantages so vital in the competitive era to follow.

WRITE FOR BULLETIN NO. 65-B



EUCLID BRANCH P. O., CLEVELAND 17, OHIO  
621 MARQUETTE BUILDING • CHICAGO 3, ILLINOIS



# STANLEY UNISHEARS

make **LIGHT** of  
**HEAVY METAL**  
cutting



**S**tanley Unishears cut cleanly along straight lines, curves, and angles at a rate up to 15 feet a minute as you feed.

Stationary models, set below bench level, permit one operator to handle large sheets or forms. There are four bench and stationary Unishear types with capacities of 14 or 10 gauge hot rolled steel.

The portable Unishear No. 144A, capacity 12 gauge hot rolled steel, provides new cutting efficiency for users of heavy sheet metal. There are three other portable types with capacities of 18, 16 and 14 gauge.

If you are looking for ways to cut costs on sheet metal work, investigate the possibilities of Unishears for the job. Stanley Electric Tool Division, The Stanley Works, 173 Elm Street, New Britain, Connecticut.



**STANLEY UNISHEARS**  
Electrically Driven Metal Shears

## NEWS OF INDUSTRY

releases and speeches," Mr. Ronan asserted. Careful job analyses and what he termed a "Personnel Audit" are required for handling re-employment on an impartial economical basis without repercussions in the direction of either the employee or the employer.

"By means of job classification and evaluation the manufacturer can fit a disabled man into the job he can do," stated Mr. Ronan. "If he cannot perform his former work, he can be fitted in wherever possible, preserving at the same time his seniority rights. In cases where a man cannot be fitted into his old company, it becomes the obligation and duty of the USES to find employment for that man."

"It would be wise and timely for any large industrial area, through its chamber of commerce, or other service organizations, to make a survey of the number of people now employed in the area, for comparison with the number employed under peacetime conditions in order to anticipate job opportunities, when the influx of returning servicemen assumes its maximum proportions."

**SWAMI:** Acting WPB Chairman J. A. Krug declares that civilian economy will return to "a 1939-plus level" at a press conference in Washington. After defeat of Germany he said the country would be "amazed at the speed with which consumer goods are turned out."







## KENNAMETAL *Lathe File* *Does as Much Work* *as 150 Mill Cut Files*

... AND PRODUCES A BETTER FINISH!

Comparative service tests continue to prove convincingly that Kennametal lathe files multiply production, improve quality of work, and effect substantial savings in the cost of files used. For example, on the job illustrated above:

A mill cut steel file, employed to remove the sharp edges from the 400 Brinell steel part, wore out on about 100 pieces. A Kennametal file turned out 800 pieces the first day—stayed on the job two weeks—and produced 15,000 pieces. The Kennametal file cut a curling chip—did not scrape or skid—and provided a finish that was almost as smooth as a grinding job!

Kennametal lathe files outlast steel files 50 to 200 times, because their surface is made of the same hard, cemented carbide composition as steel-cutting Kennametal-tipped tools. They permit filing speeds 3 to 10 times those possible with steel files—doing an outstanding job on cast iron and brass at surface speeds around 900 feet per minute, and on high-carbon, high-chromium steels at 800 surface feet per minute. The keen, sturdy teeth of a Kennametal file will make a clean, true cut on steels up to 62 Rockwell C, a hardness that ordinary files cannot touch.

The value of any tool is measured by the quality and quantity of work it produces. The higher original cost of Kennametal lathe files is insignificant compared to the tremendous economies effected through their use. Order one today for test purposes—let it prove its merit in your shop.



Kennametal Lathe Files are now furnished in two sizes—11" or 14" long—and each size is available with either 20 or 30 teeth per inch. The 11" size (F-76—30 teeth/inch; F-77—20 teeth/inch) having a filing surface 4" long x  $\frac{3}{4}$ " wide, costs \$12.50. The 14" size (F-86—30 teeth/inch; F-87—20 teeth/inch) having a filing surface 6" long x  $\frac{3}{4}$ " wide, costs \$18.50. All sizes can be shipped promptly.



# CONSTRUCTION DETAILS

for your  
CONVENIENCE

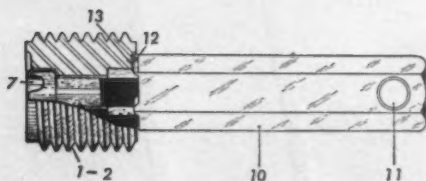


You and your employees may care to familiarize yourselves with gage terminology and construction. This is the first of a series presenting details on our various thread plugs, thread rings, plain plugs, plain rings and special gages.

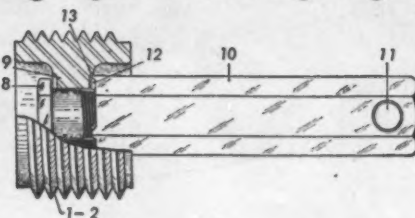
## Standard Design of Thread Plug Gages



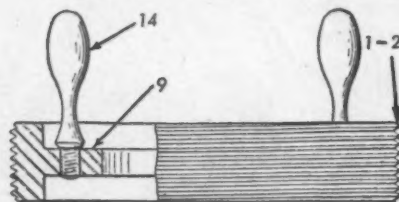
Range: No. 0 to and including 1.510 inches



Range: Above 1.510 to and including 2.510 inches



Range: Above 2.510 to and including 8.010 inches

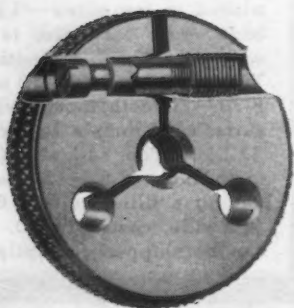


Range: Above 8.010 to and including 12.010 inches

1. "Go" gaging member
2. "Not go" gaging member
4. Shank
5. Taper lock handle
6. Drift hole or slot
7. Socket head screw

8. Hexagon head screw
9. Web
10. Handle for reversible or trilock gage
11. Cross pin hole
12. Locking prong
13. Locking groove
14. Ball handle

**PERFEX GAGE & TOOL COMPANY**  
3602 GAYLORD AVENUE DETROIT 12, MICHIGAN



THREAD RING  
GAGES  
by  
PERFEX

## NEWS OF INDUSTRY

### Water Injection Helps AAF Defeat Axis Air Forces

#### Wright Field, Ohio

• • • A little spray of ordinary water—aimed with cunning by engineers of the Air Technical Service Command—is helping warplanes of the United States defeat the Axis in the global skies.

You may have noticed that the engine in your car runs more smoothly on wet, foggy nights. ATSC engineers would tell you it is merely nature's version of the water injection system, which for the last two years has aided engines of the deadly P-47 Thunderbolts to deliver more even power strokes. And they would probably add that Col. C. A. Bassett, formerly at Wright Field, deserves a great deal of the credit for this system as he was the first man to use it in multi-cylinder aviation engines—more than ten years ago.

The idea of injecting water into internal combustion engines is not new. Engineers toyed with the idea of cooling engines internally by water as early as 1904, possibly earlier. Ford Prescott, civilian employee of the old Materiel Command's power plant laboratory at Wright Field, worked with water injection on a single-cylinder engine prior to Col. Bassett's entrance into the picture.

In 1934, when AAF planes were using a lower octane gasoline than they do now, Col. Bassett, then a first lieutenant, a project officer on Wright engines, began adapting the theory of water injection cooling to multi-cylinder engines in a search for added power, particularly on takeoffs.

Water injection, he found, not only allowed a more economical use of fuel, but suppressed detonation. Detonation is the uncontrolled burning of the fuel in the cylinder end-zone, the last of the fuel in the cylinder to burn. Under certain conditions of heat, atmosphere and other factors, this end-zone fuel burns much more rapidly than the rest of the fuel, resulting in vibration which the car records as a "ping."

Prior to water injection and 100-octane fuel, detonation was controlled by burning an extra-rich mixture, allowing evaporation of some of the unused fuel for internal cooling.

Water injection also controls detonation, allowing use of a more frugal, leaner mixture, with a saving of fuel. The water, in the form of a fine spray, is injected into the fuel



# Explosion Resisting

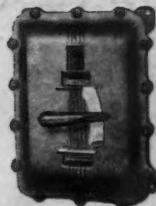
## ELECTRICAL EQUIPMENT



Industrial Multi-breaker, with arrangements up to 8 single poles, 15-50 amp., 250 volts A.C.



Industrial Circuit Breaker, 15-50 amp., 250 volts A.C. and 125/250 volts D.C., 600 volts A.C. and 250 volts D.C.



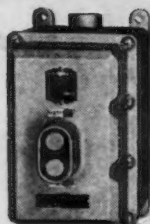
Industrial Circuit Breaker, 50-225 amp., 250 volts A.C. and 125/250 volts D.C., 600 volts A.C. and 250 volts D.C.



Industrial Circuit Breaker, 225-600 amp. (same voltages).



Type A (not fusible) Switches 30-200 amp., 575 volts A.C., 600 volts D.C.



Class 2510 Manual starters for single or three phase motors. Built in NEMA sizes O and I.



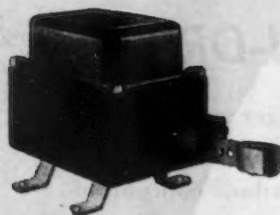
Class 9001 Push button stations up to 4 units heavy duty or 2 units standard duty construction.



Class 8536 Line voltage magnetic starters in NEMA sizes I, II and III for single, two or three phase motors.



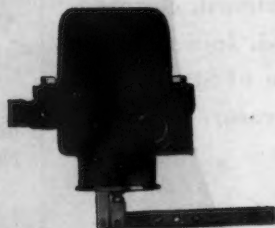
Class 9007 Heavy duty limit switches for control circuit applications.



Class 9048 Float Switch—lever operated. Light duty, standard or reverse operation.



Class 9013 AR Pressure Switch—with or without release valve—available in a variety of ranges and also as vacuum switch.



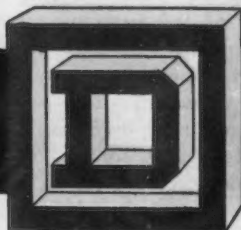
Class 9037 AR Float Switch—lever operated. Heavy duty. Available in several contact arrangements.

### for Class I, Group D Hazardous Locations

Here is a complete line of explosion-resisting electrical control—switches, circuit breakers, Multi-breakers, motor control and regulators. Made of high grade cast iron, Square D Class I Group D explosion-resisting enclosures are built to conform with requirements of the Underwriters' Laboratories, Inc. These housings have closely ground fit between cover and box and are supplied with conveniently located conduit openings.

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For complete information, write to the  
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Detroit 11, Michigan



## SQUARE D COMPANY

DETROIT

MILWAUKEE

LOS ANGELES

IS YOUR FLOOR

A CHUTE-the-CHUTE?



## Correct it with SPEEDI-DRI

OIL-SWEATING, greasy, slippery floors are no longer a hazard in plants which have discovered SPEEDI-DRI. SPEEDI-DRI provides no skidding and no kidding! This oil-thirsty, fire-retardant compound promptly soaks-up ingrained grease . . . without scrubbing. Simply spread SPEEDI-DRI, in every department, on oily areas; then sweep it up . . . and, with it, all greasy soakage. Wood, concrete, and metal floors regain their original surfaces. Aisles are brightened, cleaning-labor saved, plant morale lifted, production speeded. Join the rush of industry's top-flight maintenance-men to the use of SPEEDI-DRI, the original oil and grease absorbent. Write for literature and FREE SAMPLE—today!

SUPPLIERS: East—Refiners Lubricating Co., New York 1, New York.

Midwest & South—Waverly Petroleum Products Co., Philadelphia 6, Pa.

West Coast—Waverly Petroleum Products Co., Russ Bldg., San Francisco 4, Calif.

**SPEEDI-DRI**  
OIL AND GREASE ABSORBENT



## NEWS OF INDUSTRY

induction system between the intake manifold and the carburetor.

When water boils, it absorbs considerable heat. Therefore, when water is sprayed into a cylinder it vaporizes and takes some of the heat from cylinder walls. This cares for the heat angle of detonation. What else, possibly in the form of chemical action, takes place in suppressing detonation, engineers are still trying to learn. In any event, the end result is the suppression of detonation with slowed or controlled combustion and no danger from scored pistons or the even more violent pre-ignition.

Col. Bassett, who left Wright Field in 1935, after serving as project officer and assistant chief of the power plant laboratory, established the efficiency of water injection with multi-cylinder engines using the lower octane fuel, but before such systems would be used on production craft, 100-octane fuel was developed, giving the same performance sought from water injection.

It is a constant, seesaw battle between engines and fuels in the suppression of detonation. The war again brought up the question of water injection, for even 100-octane gasoline was unable to stand the pace set by the modern, hopped-up engines.

AAF engineers, therefore, revived, in 1942, the water injection system as developed by Col. Bassett. Not only had that officer proved its efficiency, but he had designed a spinner and nozzle for inducting the water spray through the supercharger impellers which aided the development greatly.

First tried on the P-47, the system later was used experimentally on other types and it currently is scheduled for adoption on a great many.

## Hold Tool Sale Test

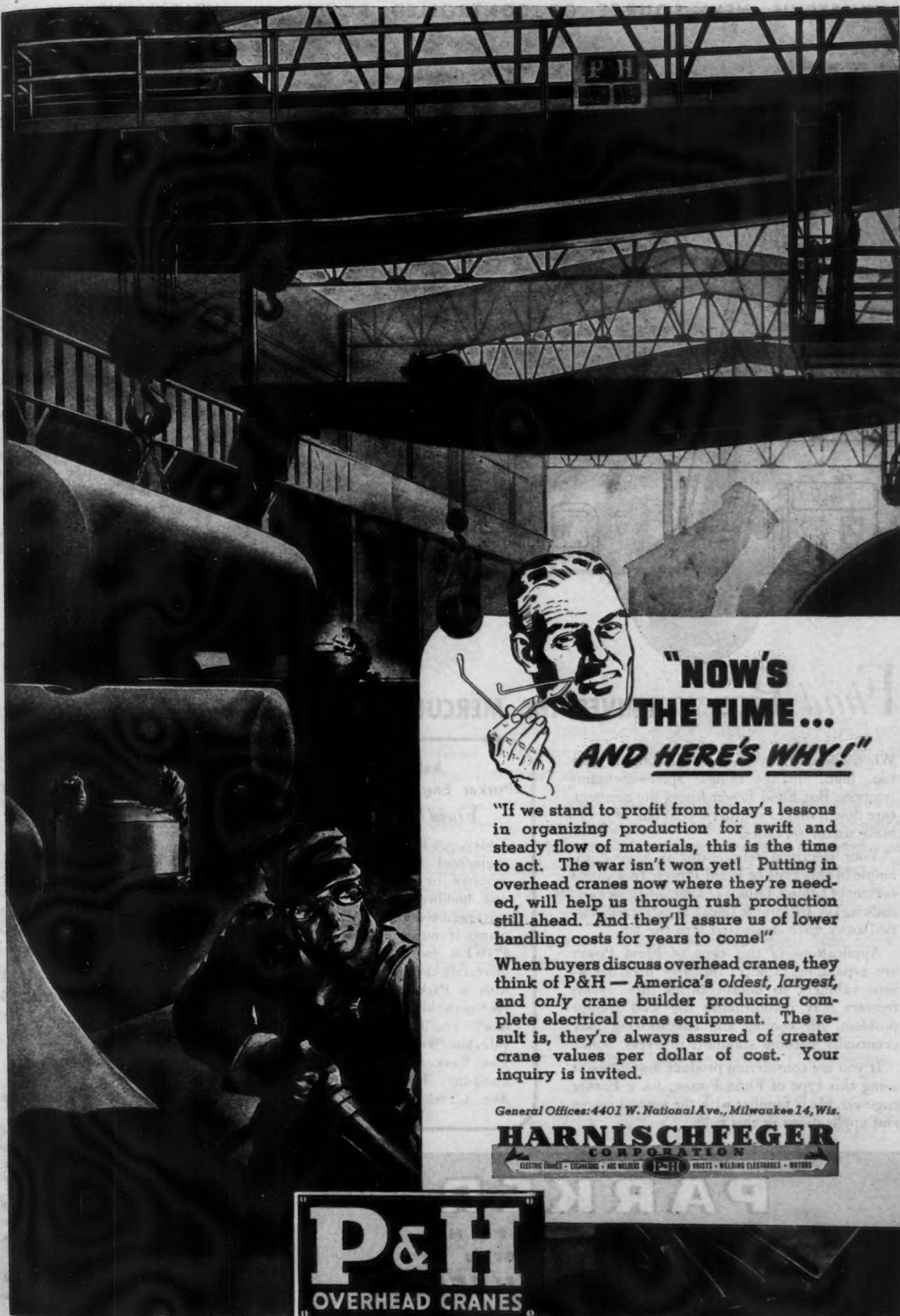
Ashland, Ohio

••• A test sale of used and new hand tools and construction equipment by the Defense Plant Corp. was held here on Sept. 8, with about 2000 bidders participating. Selected as a typical rural community for this test of how best to liquidate the vast quantities of goods and equipment at the close of the war, before the sale was half over such items as hammers, wheelbarrows, pumps, pipe threaders, and other such commodities were being knocked down at moderate prices to farmers of the surrounding areas.

Results of the sale will be studied to determine the prices obtained for the items, as compared to selling to large buyers, and how effectively distribution to the ultimate consumer was obtained.



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**P&H**

**"NOW'S  
THE TIME...  
AND HERE'S WHY!"**

"If we stand to profit from today's lessons in organizing production for swift and steady flow of materials, this is the time to act. The war isn't won yet! Putting in overhead cranes now where they're needed, will help us through rush production still ahead. And they'll assure us of lower handling costs for years to come!"

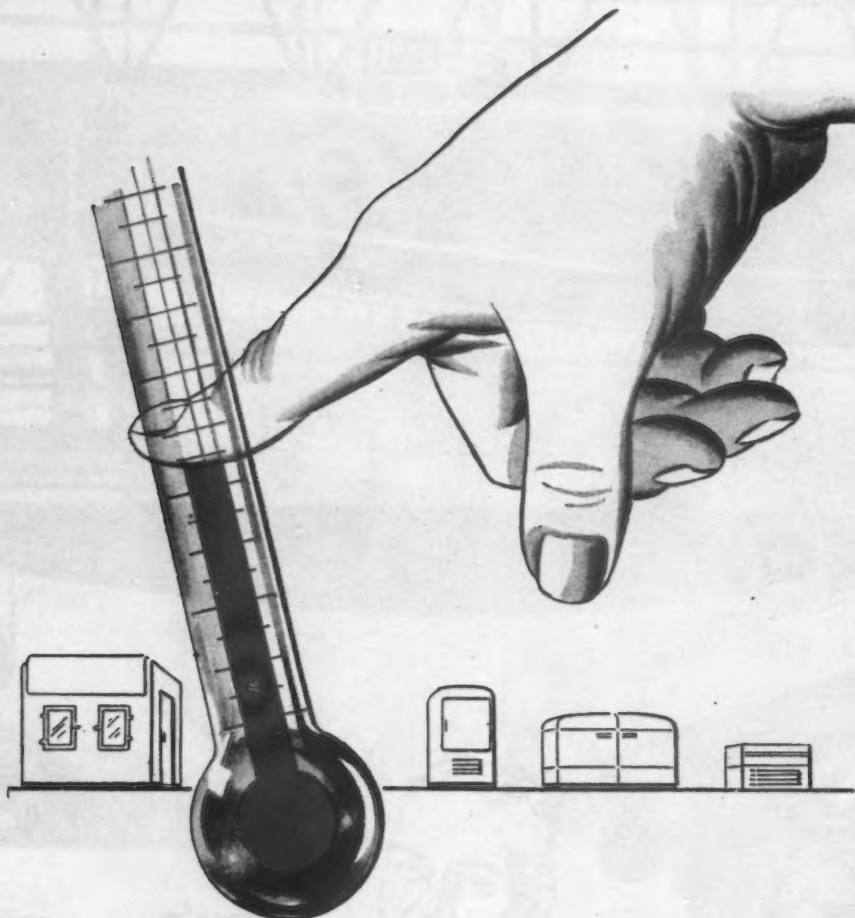
When buyers discuss overhead cranes, they think of P&H — America's oldest, largest, and only crane builder producing complete electrical crane equipment. The result is, they're always assured of greater crane values per dollar of cost. Your inquiry is invited.

General Offices: 4401 W. National Ave., Milwaukee 14, Wis.

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CORPORATION

ELECTRIC CRANES - EXCAVATORS - ARC WELDERS - **P&H** - HOISTS - WELDING ELECTRODES - MOTORS

**P&H**  
OVERHEAD CRANES



## Fluid Power DRIVES THE MERCURY DOWN

When the mercury in the thermometer rises too high, many things spoil—including tempers. But Fluid Power forces the temperature down, makes synthetic cold one of man's most useful servants.

Your electrical refrigerator is a good example of this type of Fluid Power. In a closed system of tubing, liquids change into gases and back again to liquids. Heat is extracted, carried away, then dissipated into the air.

Applications of this type of Fluid Power are expanding rapidly. Industry uses below-zero cabinets to obtain shrink fits. Home freezers may revolutionize the food storage problem. Air cooling and conditioning may eventually become standard in every home.

If you are considering product development using this type of Fluid Power, ask a Parker engineer. He is familiar with the new advances and applications in this field.

### Ask a Parker Engineer about Fluid Power

Today, you'll find Parker-engineered Fluid Power Systems in locomotives and bombers, in ships, machine tools and chemical plants. If you need FLUID POWER for control or drive, talk the matter over with a Parker engineer. He has the kind of "know-how" you'll find most valuable. Write direct to The Parker Appliance Company, 17325 Euclid Ave., Cleveland 12, Ohio.

# PARKER

APPLIANCE COMPANY

CHICAGO • LOS ANGELES

FLUID POWER ENGINEERING

## Engineer Group Will Hold Annual Conference Soon Pittsburgh

• • • The annual engineering conference of the Association of Iron and Steel Engineers will be held on Sept. 25, 26, and 27 at the William Penn Hotel. Highlighting the technical program of the conference, according to C. L. McGranahan, president of the association, will be a discussion of steel's position in regards to the total material production after the war. Mr. McGranahan stated that "greatly expanded capacities for the production of aluminum, magnesium and brass will give a peacetime surplus which will seek to cut in on steel's markets. Furthermore, expanded steel capacity will tend to eliminate the inefficient producers." This is steel's main post-war problem.

The technical sessions and papers to be presented at the meeting are as follows:

### SEPTEMBER 25

9:30 A.M.—ELECTRICAL DIVISION—Urban Room.

Chairman:	Vice-Chairman:
J. H. MILLER	R. W. GRAHAM
Electrical Superintendent	Electrical Superintendent
International Harvester Co.	Bethlehem Steel Co.
Chicago	Lacawanna, N. Y.
Wisconsin Steel Works	

"Characteristics of Crane Hoists," by M. A. Whiting and J. A. Jackson, Industrial Engineering Division, General Electric Co., Schenectady.

"Selection and Maintenance of Magnetic Brakes," by A. E. Lillquist, supervising engineer, Engineering Department, Cutler-Hammer, Inc., Milwaukee.

Symposium — "Communication Systems in Steel Plants." (Speakers to be announced.)

### 1:30 P.M.—MECHANICAL AND WELDING DIVISION—Cardinal Room.

Chairman:	Vice-Chairman:
F. C. SCHOEN	T. R. MOXLEY
plant engineer	general master mechanic
The Midvale Co.	Wheeling Steel Corp.
Nicetown, Philadelphia	Staubenville, Ohio

"Welding and Cutting Applications in Steel Plant Maintenance," by S. D. Baumer, steel mill representative, Air Reduction Sales Co., New York.

"Alloy Steels for Maintenance in the Steel Plants," by J. A. Rosa, Metallurgical Department, Republic Steel Corp., Massillon, Ohio.

"Maintenance With Low Temperature Welding," by R. D. Wasserman, president, Eutectic Welding Alloys, Inc., New York.





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War brought a stupendous demand for military machines. The automobile industry converted assembly lines and production systems and used these procedures to manufacture that vitally needed equipment.

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TITAN supplies these assembly lines with hot pressed brass parts of various and intricate shapes, many faultlessly machined for immediate insertion in these machines of war. Call on us after this war is won. We can then supply you with superior hot pressed parts.

## NEWS OF INDUSTRY

1:30 P.M.—OPERATING PRACTICE DIVISION—Urban Room.

Chairman: A. S. GLOSSBRENNER, general superintendent, Youngstown District Tube Co., Youngstown.  
Vice-Chairman: R. H. GELDER, works metallurgist, American Rolling Mill Co., Ashland, Ky.

"The Unitemper Mill," by M. D. Stone, manager Development Department, United Engineering & Foundry Co., Pittsburgh.

"Shearing Flat Rolled Steel," by F. E. Flynn, district manager, Republic Steel Corp., Warren, Ohio, and D. A. McArthur, chief engineer, Wean Engineering Co., Warren, Ohio.

"The Place and Effect of Conveyor Equipment in Industry," by J. E. McBride, vice-president, Palmer-Bee Co., Detroit.

Symposium—"Cleaning of Steel for Subsequent Coating." (Speakers to be announced.)

8:00 P.M.—Motion Pictures, selected subjects—Urban Room.

### SEPTEMBER 26

9:00 A.M.—ROLLING MILL DIVISION—Urban Room.

Chairman: LOUIS MOSES, superintendent, Rail Mill and Roll Department, Bethlehem Steel Co., Sparrows Point, Md.  
Vice-Chairman: F. G. KREDEL, superintendent, Bar Mills, Republic Steel Corp., Cleveland.

"Salvaging Alloy Steel Rolls," by H. L. Watson, Jr., superintendent, Special Products Department, Midvale Co., Nicetown, Philadelphia.

"Structural Mills and Structural Mill Roll Design," by Ross E. Beynon, superintendent, Roll Shop Department, Carnegie-Illinois Steel Corp., South Chicago, Ill.

"Billet Preparation for Rolling Mills," by F. F. Cambest, general foreman, Steel Supply and Preparation, Jones & Laughlin Steel Corp., Pittsburgh.

1:30 P.M.—COMBUSTION DIVISION—Cardinal Room.

Chairman: E. E. CALLINAN, combustion and refractory engineer, Steel and Tube Division, Timken Roller Bearing Co., Canton, Ohio.  
Vice-Chairman: J. J. ALEXANDER, assistant power superintendent, Republic Steel Corp., Cleveland.

"The Problem of Reversing Regenerative Furnaces," by J. P. Vollrath, Industry Engineering Department, and J. R. Green, manager Steel and Ceramic Division, Brown Instrument Co., Philadelphia.

"Developments in Rotary Hearth Furnaces," by J. H. Loux, Salem Engineering Co., Salem, Ohio.

"The Continuous Determination of Oxygen and Combustibles in Furnace Flue Gases," by John F. Luhrs, Research Department, Bailey Meter Co., Cleveland.

1:30 P.M.—ELECTRICAL DIVISION—Urban Room.

Chairman: E. L. ANDERSON, electrical superintendent, Bethlehem Steel Co., Johnstown, Pa.  
Vice-Chairman: L. R. MILBURN, electrical engineer, Great Lakes Steel Corp., Ecorse, Detroit.

"Increasing the Power on Existing Cold Mills," by F. R. Burt, industrial engineer, and B. J. Auburn, electrical engineer, West-



# EXAMINATION

## Production Radiography

When space and budget limitations must be faced, the Picker Simplex Cabinet provides an economical, flexible method for moderate quantity x-ray inspection. It is safe and extremely compact, requiring a floor area of only four square feet. The use of either the Mass Production Cabinet or the Simplex Exposure Cabinet eliminates the necessity for expensive lead-lined rooms for radiographic work.

Picker Bulletin No. 2544 gives details of construction, capacities, ratings of these Picker Production X-ray Units. Send for it, or better still, call in a Picker Field Man. He's as near as your telephone...and will be glad to discuss your inspection problems with you.

### PICKER "SIMPLEX" X-RAY CABINET

Parts dollies move on tracks to permit quick, accurate placement of objects under the x-ray tubehead.

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**P**roduction efficiency often calls for the installation of drop hammer batteries close to precision machine tools which are seriously affected by external vibration. Such a plant layout is now possible because the shock of the hammer blow can be completely isolated by steel springs as incorporated in Korfund Vibration Control.

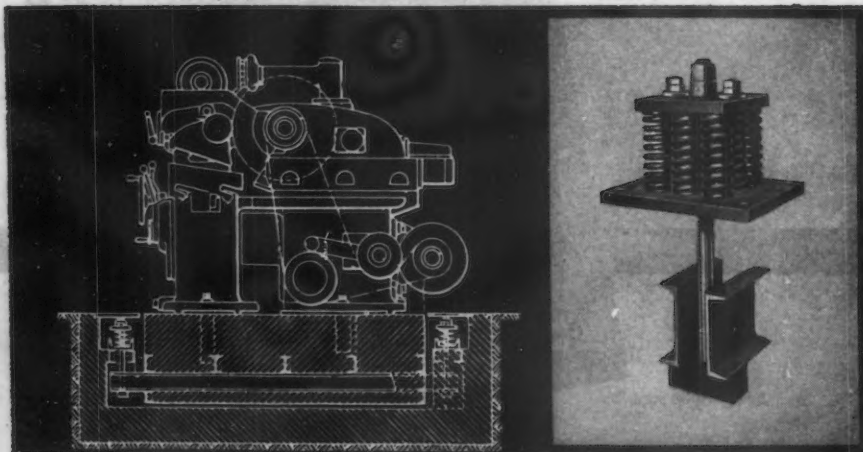
The most satisfactory method is to isolate the hammer itself and thus eliminate the transmission of vibration completely. But, when existing hammer equipment cannot be shut down for the time required to install vibration equipment, it is possible to isolate the precision equipment instead. Such an installation of Korfund Vibro Isolators is shown in the sectional drawing of a large roll grinder.

Forty years of engineering study and over a quarter of a million installations give Korfund engineers the necessary background for the correct solution of your vibration problems.

*Have you investigated the many advantages of vibration control? If not, why not write for information today.*



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## NEWS OF INDUSTRY

inghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"The Electronic Frequency Changer," by A. G. Darling and L. W. Morton, General Electric Co., Schenectady, and F. W. Cramer, electrical engineer, Carnegie-Illinois Steel Corp., Pittsburgh.

"Blast Furnace Skip Hoist," by Gordon Fox, vice-president, Freyn Engineering Co., Chicago.

7:00 P.M.—INFORMAL STAG DINNER—Ball Room.

George P. Comer, economic adviser of the Anti-Trust Division, Department of Justice, and adviser to the U. S. Senate subcommittee on postwar industrial policy, will be the principal speaker at this dinner. Mr. Comer will discuss postwar plans and postwar planners, and will touch on the subject of disposal of our government-owned war plants.

### SEPTEMBER 27

9:00 A.M.—OPERATING PRACTICE DIVISION—Urban Room.

Chairman:	Vice-Chairman:
W. H. COLLISON	H. W. CAMPBELL
superintendent, Coke	plant engineer
Plant, Blast Furnace	Interlake Iron Corp.
Division	Toledo
Great Lakes Steel	
Corp.	
Ecorse, Detroit	

"Gas Turbines for Blast Furnace Blowers," by Paul R. Sidler, electrical engineer, Brown, Boveri & Co., Ltd., New York.

"Design and Operation of Modern Sintering Plants," by C. J. Duby, chief engineer, Warren District, Republic Steel Corp., Warren, Ohio.

"Performance of Large Hot Blast Stoves," by B. B. Frost, service engineer, Arthur G. McKee Co., Cleveland.

1:30 P.M. — COMBUSTION DIVISION—Urban Room.

Chairman:	Vice-Chairman:
L. N. McDONALD, Jr.	C. J. WYROUGH
chief power and fuel	superintendent, Steam
engineer	Efficiency and Com-
Carnegie-Illinois Steel	Combustion Department
Corp.	Jones & Laughlin Steel
Youngstown	Corp.
	Pittsburgh

"Blast Furnace Gas in Modern Steam Generating Units," by Frank X. Gilg, Service Department, The Babcock & Wilcox Co., New York.

"New Open Hearth Furnaces at Homestead," by H. J. Pugsley, engineer, Swindell Dressler Corp., Pittsburgh.

Round Table Discussion — "Disposition of Coke and Blast Furnace Gas." (Speakers to be announced.)

1:30 P.M.—LUBRICATION DIVISION—Cardinal Room.

Chairman:	Vice-Chairman:
C. E. S. EDDIE	S. C. GRIFFITH
Lubrication engineer	Lubrication engineer
Great Lakes Steel	Jones & Laughlin Steel
Corp.	Corp.
Ecorse, Detroit	Pittsburgh

"Use of Demulsifiers in Circulating Oil Systems," by T. G. Roehner and E. S. Carmichael, Socony-Vacuum Oil Co., Brooklyn.

"Additives in Lubricants," by C. E. Pritchard, lubrication engineer, Republic Steel Corp., Cleveland.

"Current Developments in Industrial Lubricants and Their Influence on Post-War Products," by G. F. Bowers, Standard Oil Co. of Indiana, Chicago.



# ...AND ARE ALIKE, IN SIZE... BUT WHAT A DIFFERENCE YOUR LAB- ORATORY WOULD FIND IN THEM!

● Three of these bolts photographed have exactly the same dimensions— $\frac{3}{4}$ " x 6"—and there their resemblance ends.

We have arranged them in the photograph to match up with the table of their physicals, at left, below, where you may compare these three bolts, point by point. And in the variation of their physicals lies your opportunity to profit by Lamson & Sessions' "know how", always at your command without obligation.

It is obvious that bolts in larger and smaller sizes than those shown, made of the same materials, made the same way, properly heat treated, will develop proportionately the same physicals and characteristics as these three bolts.

What about the fifth and smallest bolt? We'll tell you. Note that it also is the same length as the others, but it is only  $\frac{1}{2}$ -inch in diameter, or less than half the weight of the bolt made of SAE 1020 steel with corresponding physicals! It will carry approximately the same load in tension as the larger bolt.

Do you want to save weight in the bolted assembly you are laying out? Do you want to save critical materials and get faster deliveries? Do you want to use every means in conserving war materials?

If you will apply the principles involved in modern bolt engineering, and design for, and specify, a bolt having the required strength you need in the smallest possible size—you will have accomplished all three objectives mentioned above! Saving weight is a prime objective today whether you're building a bomber, a tank, a gun carriage, a ship or anything else—and you can save weight if you can design to use a bolt one-half the size *you thought you needed*.

Requiring less material, by 50%, than its larger counterpart above, having the same strength—the fifth bolt shown, if we made it for you, would allow us to draw that much less upon critical materials; we would need a smaller inventory of materials, and less shipping space would be needed for the finished bolts because we can ship twice as many bolts in the smaller size than the larger size. A whole train of favorable circumstances is set in motion when you let bolt engineers help you engineer a smaller bolt into your designs!

Ask Lamson engineers for solutions to your fastening problems. Maybe out of their vast experience they can help you. Lamson "know how" is at your disposal *now, and after the war is ended*.

THE LAMSON & SESSIONS COMPANY, General Offices, Cleveland, O.



"BOLTS, NUTS & SCREWS"—1944 REVISION, Cloth bound, Limited edition, 180 pages of technical, practical information. Sent prepaid for \$1.00—cash or check must accompany your order.

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Name of Individual

Title or Kind of Work

Employed by (Name of Company)

Street Address

City and State

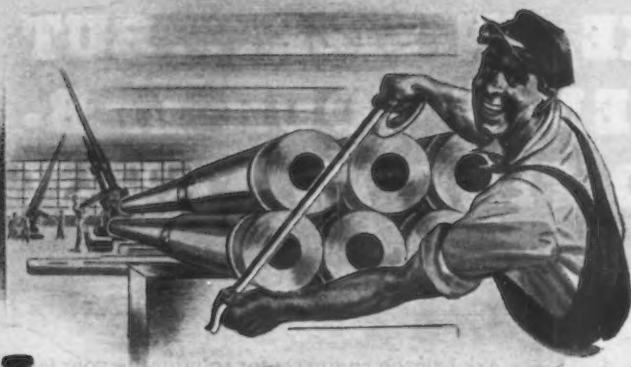
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Your Jobber Stocks the Lamson Line

## INDUSTRIAL PLANTS PLEASE NOTE!



# You can't go wrong unless you have Achromatopsia\*

*It's really something in industry to be able to tell a worker, skilled or unskilled, "Mister, if you can tell red from green, you can do this job."*

In simplest terms that's the story of Filmonize colored TAPES. Errors in identification have been kept to a minimum in thousands of war plants throughout the country. Filmonize colored TAPES identify the destination of war shipments—they grade raw materials—they offer a means for inspectors to mark spare parts for rework or rejection—they expedite the manufacture of complicated assemblies—they color code wire and tubing for split-second identification.

With Filmonize you get one, two, or three colors on one roll—you can seal, protect and identify in one simple operation. Ask your distributor now to show you how Filmonize can cut production costs and increase the out-put of your plant.

\* Color blindness

## FILMONIZE SETS NEW STANDARDS

- Easy to use—strips cleanly off the roll.
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- Fade-proof colors...printing sealed in.
- Widths from  $\frac{1}{2}$ " to 18" throughout the FILMONIZE line.

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FOR COLOR  
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FILMONIZE IT!



## NEWS OF INDUSTRY

### Reynolds Will Make Aluminum Castings At New England Plant Springfield, Mass.

... Production of aluminum permanent mold castings in the foundry here which the Reynolds Metals Company has leased from the Defense Plant Corp., will start by mid-September, R. S. Reynolds, president of the Reynolds organization, announced recently.

At the same time, Mr. Reynolds revealed that plans call for postwar operation of the Springfield plant as an integrated part of the Reynolds aluminum producing organization. In the postwar period, he said, the foundry will employ from five to six times as many workers as under the present wartime schedule.

For the duration, the foundry under Reynolds direction, will produce aluminum castings for the Rolls Royce Merlin engine now being built in the United States by the Packard Motor Car Company and Continental Motors. Postwar plans call for production in the plant of not only permanent mold castings but also pressure die and sand castings for automobile motors, washing machines and vacuum cleaners along with a complete line of cast aluminum cooking utensils.

T. A. Lynch, Reynolds vice-president, will be in direct charge of the Springfield foundry.

### Employment and Payrolls In Steel Industry Increase

New York

... Employment and payrolls in the steel industry increased in July over the June levels, according to a recent report by the American Iron and Steel Institute.

The industry employed in July an average of 571,400 workers, compared with 569,800 in June. In July 1943, the total number of employees was 627,000.

The July payroll amounted to \$14,794,000 which compares with \$14,484,000 in June, and \$142,768,980 July a year ago.

Wage-earning employees received an average of 120.0c. in July, compared with 117.7c. per hr. in June and 115.5c. in July of last year.

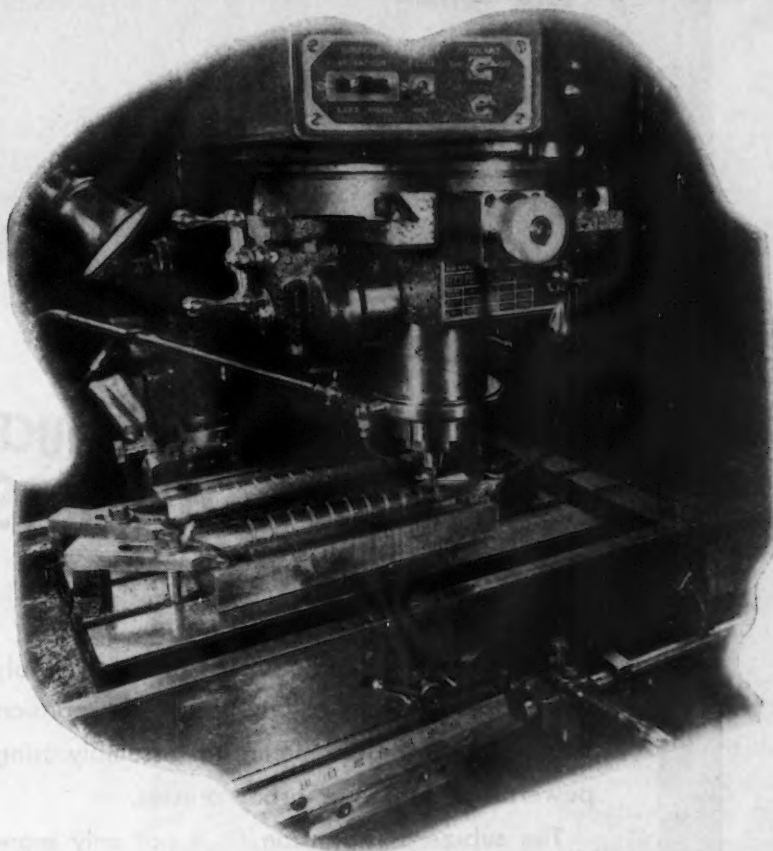
Wage earners worked an average of 45.4 hr. in July as against 47.3 per week in June and 43.5 hr. in July 1943.



# ROTARY HEAD MILLER . . . PLUS CHERRYING ATTACHMENT . . . SIMPLIFIES THIS "TRICKY" MILLING OPERATION

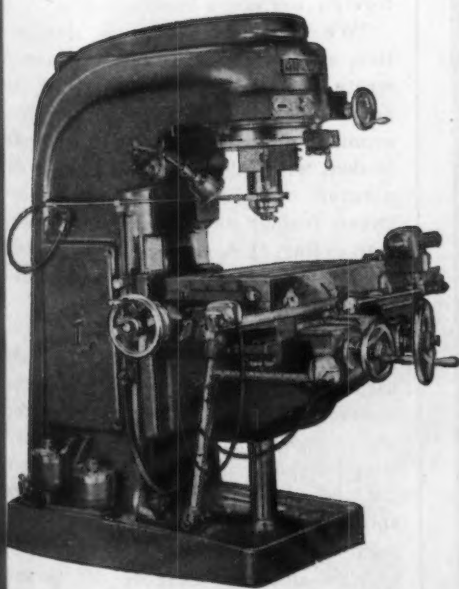
The Milwaukee Rotary Head Miller equipped with a cherrying attachment made "short work" of the "tricky" milling required on this injection mold. It took just two hours to complete the job — far less time than by any other method known.

The cherrying attachment is an auxiliary rotary head, mounted at 90° to the head of the miller. It is used to mill circles and angles in a vertical plane. When used with rotary head motion, spherical and conical cavities can be accurately and rapidly milled — in almost all cases difficult operations become a comparatively simple task.



## KEARNEY & TRECKER'S ROTARY HEAD MILLER

*The Most Versatile Machine Ever  
Designed for Mold and Die Work*



**DIRECT** . . . mills mold cavities in a single set-up without the aid of templates or models.

**ACCURATE** . . . chances for error are eliminated because there is no change in set-up. Exact control of all combinations of cutting movements — possible only with this machine —

transmits mathematical precision to the work.

**FAST** . . . initial job preparation and set-up time is reduced to the minimum. Accurate performance of the machine saves operator's time and rapid production of intricate molds and dies is the result.

*Write for Bulletin No. 1002C for complete information on the Milwaukee Rotary-Head Miller and the accurate and rapid production of all types of molds and dies.*

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Milling Machine

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# Sub-zero



## THE NEW WAY TO REDUCE SHOP COSTS

**M**ANY metal-working plants are very profitably using sub-zero temperatures to make expansion fits instead of the old method of assembly using powerful hydraulic or arbor presses.

The sub-zero expansion fit is not only more economical—it is faster and safer. It does not induce mechanical strains within the male part. There is no danger of scoring the walls of the female member nor of misalignment of the male as it moves into position. There is no chance of bending or twisting of the male part in the operation. And the entire process is under close control.

Kold-Hold Sub-Zero Machines are serving the metal-working industry for this and other low temperature processes. Write for specific information.

### KOLD-HOLD

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LANSING 4, MICHIGAN

## Executives Favor "Hands Off" Policy For Foreign Trade

### New York

••• Confidence in the prompt revival of foreign trade after the war and a belief that government should follow a "hands-off" policy, were the predominant opinions expressed by top industrial executives in a symposium conducted by the National Industrial Conference Board recently.

Of the several hundred executives representing all branches of industry who were queried by the conference board, over one-third urged the "hands-off" policy. Typical of this viewpoint was the following statement by one executive:

"We believe the policy of the government, in order to facilitate foreign trade of private industry after the war, should be to leave industry alone.

"In other words, totally divorce the federal government from private industry, except to see that any and all business is conducted in an honest, ethical and fair way, for which there are ample laws which need no bureaucratic interpretation and control."

Participants in the symposium, all of whom were engaged in foreign trade operations before the war, held that the government should take measures to free foreign exchange and foreign balances, and remove foreign exchange restrictions.

"We consider monetary stabilization, as it concerns foreign exchange, wrote one correspondent, "to be the most important problem for this government and all foreign governments to deal with. If the exporters can be assured of a fixed relationship between foreign money and the American dollar, then the greatest obstacle to foreign trade will have been removed."

Many executives believed that the government should provide manufacturers with information regarding the opportunities in other countries for their product, the variations they would have to make in that product for the country concerned, and give some information regarding the credit position of the likely purchasers.

A considerable number of the executives stressed the need for the United States to accept imports, perhaps on an enlarged scale, if foreign countries are to be able to buy our exports. "Our tariff schedules," declared one, "will have to be reestablished on a progressively lower basis."



# How to put a twist in a bend!

FOR you, maybe APEX Universal Joints are old standbys. You perhaps know designers are using these Joints in the crucial spots—in presses, grinders, multiple spindle drills, valve controls, sheet levelers, food processing and packaging machinery and what not. They lick knotty design problems and give consistent trouble-free service.

APEX Universal Joints cannot wear into an overtravel position and become locked—have the lowest deflection rate, highest shock resistance and endurance—in sizes

from  $\frac{1}{8}$ " to  $1\frac{1}{4}$ "—flexibly covered, lubricant filled and sealed—with torque ratings up to 14,800 inch-pounds—in all standard sizes, or in specials engineered to your necessities. For

further details write for our Data Sheets for Designers and Bulletin No. 103.

## APEX

### Universal Joints

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Manufacturers of Safety Friction Tapping Chucks, Quick Change and Positive Drive Drill Chucks, Vertical Float Tapping Chucks, Parallel Floating Tool Holders, Power Bits for Phillips, Slotted Head and Clutch Head Screws, Hand Drivers for Phillips and Clutch Head Screws, Aircraft Universal Joints, Plain and Universal Joint Socket Wrenches.

## NOW YOU CAN DRILL HARDENED STEEL



### with "HARDSTEEL" Drills

These are just a few of the many uses for "HARDSTEEL" drills — the drills that drill steel hardened by any method without annealing.

1. Drill holes in full hardened dies.
2. Drill holes in armor plate.
3. Remove broken set screws on a drill press.
4. Start holes in case hardened parts.
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6. Drill spring steel after tempering.
7. Drill parts after hardening to avoid warping or distortion.
8. Drill production parts after hardening to speed matching at assembly.
9. Drill work-hardening materials.
10. With a slight change in point grinding, drill hard carbon and plastics.

To save time and speed production on dozens of jobs, all you need are a drill press, a "HARDSTEEL" drill and the "know-how" given in detail in the "HARDSTEEL" Operators Manual. It tells recommended speeds, how to grind these drills on an ordinary wheel, when to use coolants, how to use drills for countersinking and counterboring and a wealth of similar information. Write for your copy today.



and TOOL TIPS are made of the same special "HARD-STEEL" alloy to speed production when machining tough steels, scale covered forgings and the abrasive copper and light metal alloys.

**"YOU HARDEN IT —  
WE'LL DRILL IT"**

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## "HARDSTEEL"

DRILLS • TOOL BITS • SPECIAL TOOLS

Others advocated the continuation or expansion of the reciprocal trade agreement program.

Many minor recommendations were made by the symposium. A few correspondents urged support of the United States merchant marine; others desired greater freedom from United States legal restrictions for manufacturers and traders operating in foreign countries. A spokesman for the latter opinion wrote: "The present confusion that exists with respect to marketing and other types of cartels abroad should be dissipated."

### Standard Cost System Urged by R. T. Brooks For Structural Steel

New York

• • • Robert T. Brooks, executive vice-president of the American Institute of Steel Construction, recently urged the entire structural steel fabricating industry to establish a standard system for ascertaining and recording costs.

In an editorial published in the September issue of the "A.I.S.C. News," an industry publication, Brooks said:

"As we approach the postwar period, we should make a special effort as an industry to increase efficiency and refine costs. It is a matter of common experience that what one yields in adopting a standard is more than made up in the benefits which follow."

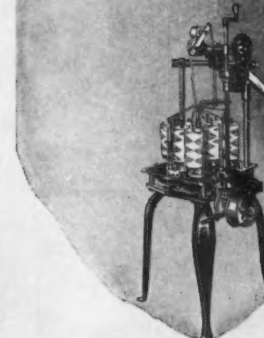
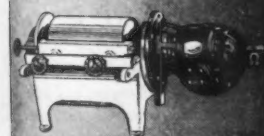
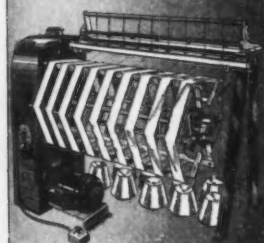
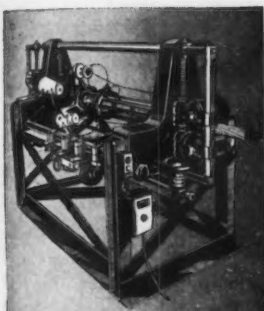
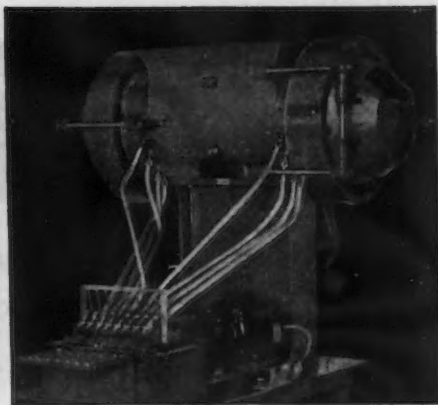
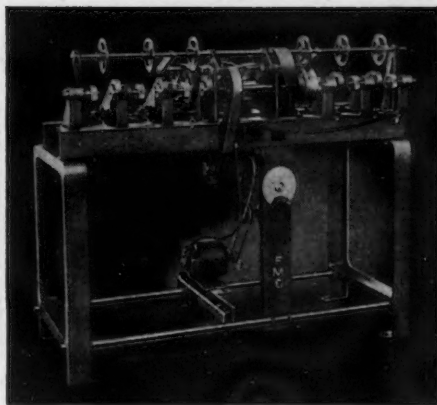
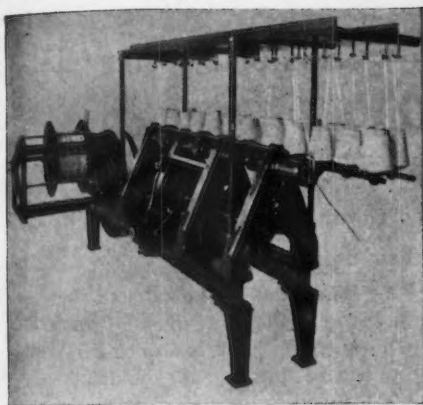
Brooks called attention to the A.I.S.C. Cost Manual published as a guidebook for the structural steel fabricating industry, and urged wider usage of this information in all industry and public dealings.

Not only is it important for the industry to promote standards which will be acceptable to the public, Brooks stated, but it is necessary to introduce this knowledge to government authorities.

"I am greatly impressed," he said, "with the knowledge that the various agencies of the government and the general public expect much of business and business men. Their methods and their conduct are under constant review."

"It is therefore wise and necessary that business devise, publish and establish acceptable standards or criteria so that its acts and methods may be clearly understood and interpreted by all concerned."





# FIDELITY Machines may make yours a Post-War Period... *Saturated with Opportunity*

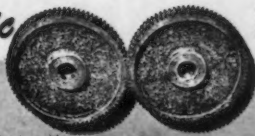
**I**T'S largely a matter of being ready *before* the day of transition—of looking into the matter *now* to see which of FIDELITY'S present machines will clip minutes, multiply manpower, cut horsepower or otherwise reduce manufacturing costs for you.—Or of seeing if FIDELITY can use its technical imagination, interpretive engineering and unusual facilities to develop or adapt a machine to your special needs.

Start preparing now by sending for a 48-page book illustrating and describing a few of the more than one thousand special-purpose machines wholly or partly designed or redesigned and built by FIDELITY during the past third of a century.



**BONDS**—Buy them now to Bring the Boys down the Home Stretch

*Intricate, Automatic*



*Precision Machines*

**FIDELITY MACHINE COMPANY**

3908-18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

# GRAND RAPIDS

No. 4 and No. 5 Universal Cutter and Tool Grinders combine rigidity with flexibility so that the most complex jobs may be done with maximum convenience.



GRAND RAPIDS NO. 4 MOTOR DRIVEN UNIVERSAL CUTTER AND TOOL GRINDER WITH POWER FEED TO TABLE

These No. 4 and No. 5 machines are obtainable with power feed and with provision for wet grinding making it possible to handle the occasional job of internal or cylindrical grinding advantageously.

Send for Bulletin #1243.

Reasonably prompt delivery.

**GALLMEYER & LIVINGSTON CO.**  
200 STRAIGHT AVE., S.W.  
**GRAND RAPIDS 4 MICHIGAN**

## NEWS OF INDUSTRY

### No Fear of Deflation For Manufacturing After End of War

New York

• • • The index of the value of factory output extended its decline to 306.0 in July from 307.2 in June and from the record high peak of 325.0 last October, according to the Alexander Hamilton Institute. Nevertheless the value of factory output in July was still well above normal.

In view of the abnormally high level attained by the value of factory output, the recent downturn was a natural development with the weakening of artificial support. The abnormally high level has been sustained by the extraordinary requirements of the government for war purposes. Now that government buying is undergoing some curtailment, the tendency is for the value of factory output to work back toward a normal level.

Whether a further adjustment occurs will depend on the government's requirements from now on. If the war should end in Europe this fall, as is now expected in Washington, it is probable that government buying would be further curtailed despite the

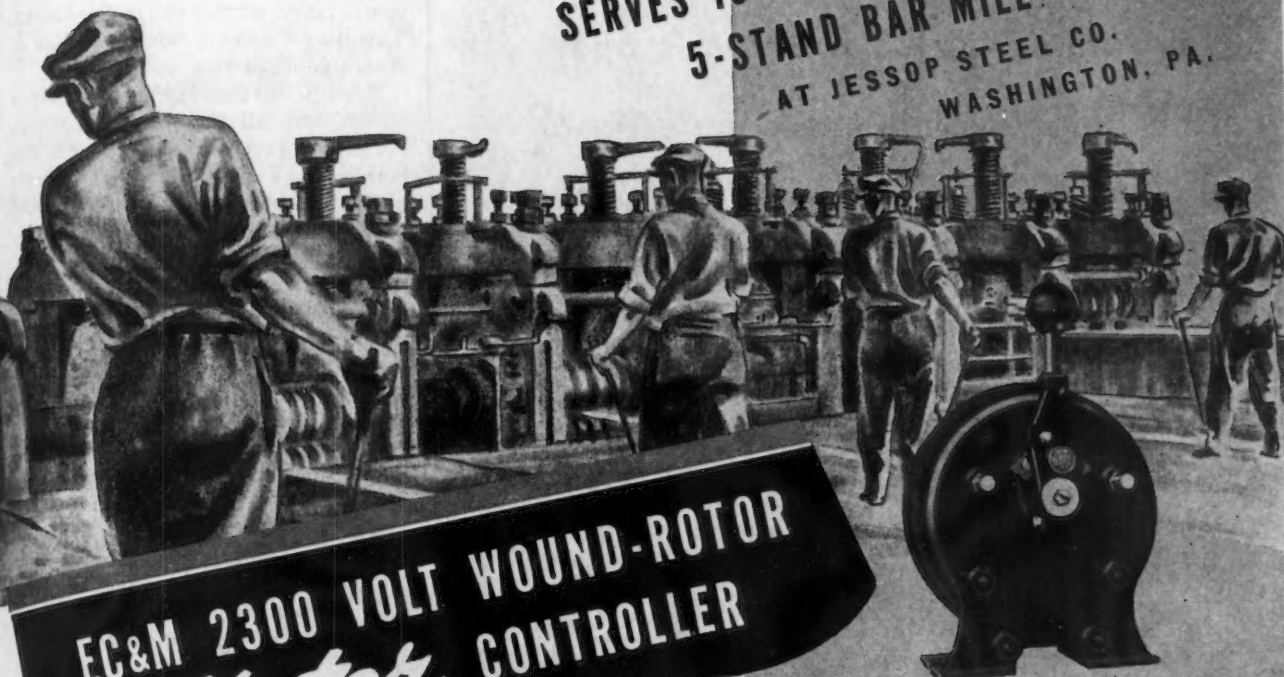
**WHIZ KID:** In Chicago, 11-year-old Jack Butler, local "brain truster," assembles the 500-odd parts of an aircraft injection carburetor in 90-min. Jack has an important war job after school testing visual training aids used to prevent guesswork in war production.





SERVES 18-INCH,  
5-STAND BAR MILL.

AT JESSOP STEEL CO.  
WASHINGTON, PA.



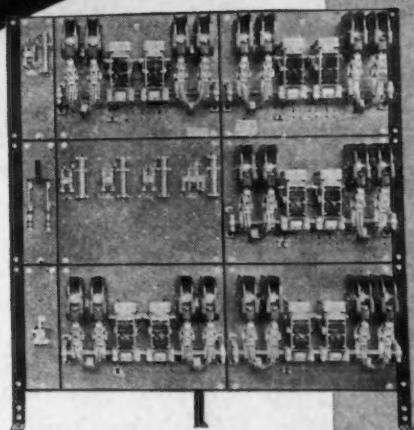
## EC&M 2300 VOLT WOUND-ROTOR *Motor* CONTROLLER

For 2300 volt, wound-rotor motors, EC&M Non-reversing or Reversing Control is without equal. And for the primary, high voltage switching requirements, Type ZHS Magnetic Contactors are used.

These contactors are of compact design and oil-immersed, with the control circuit potential transformer, in a single shock-proof enclosure. For reversing applications, as used on this 18-inch mill, two contactors are mounted back-to-back with heavy, mechanical interlock-bar between them and enclosed under oil in one tank.

Panels for controlling the secondary, or rotor, circuit consist of *LINE-ARC* Contactors and Frequency Acceleration Relays. Type NX Master Switch gives speed control.

Specifications of these EC&M Wound-rotor Motor Controllers are given in Bulletins 1062-C, 1140-B, and 1182-2. Write for your copies.



### OUTSTANDING FEATURES of EC&M 2300 Volt Magnetic CONTACTOR CONTROL

- 1 Heavy-duty, mill type, 2300 volt contactors—mounted under oil in one enclosure with positive interlocks for separating the circuits.
- 2 *LINE-ARC* magnetic contactors for control of secondary circuits having low upkeep cost, high arc-rupturing ability.
- 3 *FREQUENCY RELAYS* govern rate of acceleration automatically—respond accurately to motor speed, increasing motor torque as required.
- 4 Potential transformer, self-contained in contactor enclosure, supplies 220 volts for control circuit.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79th STREET • CLEVELAND 4, OHIO

## This summary of a full year's operation helps explain the popularity of Detroit Rocking Electric Furnaces

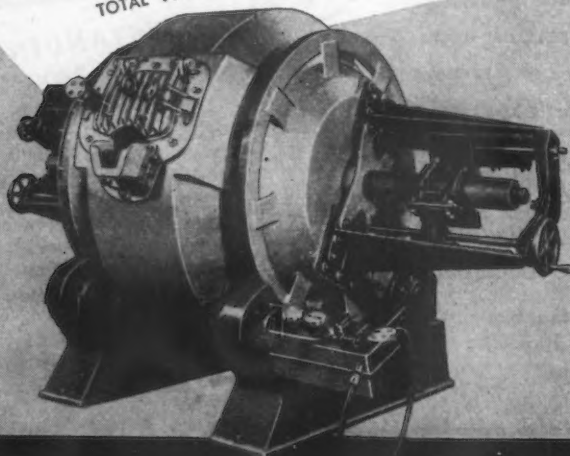
Records of their performance reveal why Detroit Furnaces have steadily increased in popularity. With a Detroit Furnace you can get 8 ferrous or 16 non ferrous heats in one eight-hour day—and with a minimum amount of labor.

You can get precise metallurgical control and thus highest quality results. Versatile, flexible and fast, the Detroit Rocking Electric Furnace has proven itself the most efficient Foundry melting unit for the widest variety of metals and alloys.

### SUMMARY OF ONE YEAR'S PERFORMANCE Of Midwestern Manufacturer of Steam Specialties Using 4—Type AA—1000 lb. Detroit Electric Furnaces

Metal Melted .....	9,624,625 lbs.
No. of heats melted .....	12,049 heats
Electrodes used .....	17,960 lbs.
3.75 lbs. electrodes per ton of metal.	
Power Used .....	280 Kw. Hrs. per ton
Net Metal Loss .....	0.5%
Overall Plant yearly shrinkage of metal .....	1.40%
Charges consisted of:	
Total Remelt .....	55%
Gates .....	32%
Scrap .....	5%
Borings .....	18%
Ingot—made in 2000 lb. Detroit Furnace from	
Furnace charges of grindings, concentrates, .....	27%
Turnings and scrap .....	18%
Purchased new metals .....	100%
TOTAL .....	

There is a correct size Detroit Furnace to meet all requirements from the 10 lb. laboratory size up to 8,000 lbs. molten metal capacity.



**DETROIT** ELECTRIC FURNACE DIVISION  
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

continuation of the war in the Pacific. This would mean a further decline in the value of factory output.

Even if the value of factory output should drop all the way back to the currently prevailing normal level, the detrimental effect on the nation's present economic structure would probably be relatively mild. If, however, the normal level should drop, the situation would take on a much more serious aspect. The prospect is that such a development will ultimately occur.

The prevailing normal level is highly inflated as the result of the government's deficit-spending. It is evident that when such spending is curtailed, the present normal level will be subject to deflation. There is a good possibility, however, that this deflation will not occur immediately after the war ends.

Even if the government curtails its spending at once, the effect of its deficit-spending during the war will tend to provide inflationary support for a temporary period after the war. The deficit-spending during the war will be carried over into the postwar period in the form of accumulated savings in the hands of the people, amounting possibly to \$125,000,000,000. Part of these funds are likely to be actively employed for a while, thus postponing a pronounced deflationary movement until such a time as this money becomes dormant.

### Animated Films Cover Fundamentals of Hydraulics

• • • Two of a series of new educational motion picture films on hydraulics are now available for group showings to aircraft and industrial engineers and students, according to an announcement by Adel Precision Products Corp., Burbank, Cal. The films are 16 mm. animated color cartoons with sound. Both are 10 min. in length. Film No. 1 covers basic hydraulics and No. 2 the fundamentals of fluid flow.

Produced by the Raphael G. Wolff Studios of Hollywood under the supervision of Adel's engineering service department, the films are especially designed to enable students to more easily grasp the fundamentals of hydraulics. The unusual animated approach to the subject will be of interest to both advanced engineers and beginners.

Arrangements for showing the films may be made through Adel engineering service departments at Burbank, Cal., and Huntington, W. Va.



**DO YOU WANT TO SHARPEN . . .**

**. . . broaches up to 84" long?**

**. . . small broaches?**

**. . . flat broaches?**

**. . . round broaches?**

**. . . more accurately?**

**. . . WITH WOMEN OPERATORS?**




You need only one machine to do all this: the new COLONIAL CS-2-84(\*) Sharpening machine. In addition to all the well known Colonial features, you will find on this machine such important features as:

Full anti-friction double-row roller action to guide the sliding head plus use of light-weight alloy castings for the moving head, reducing weight to 1/3 that required with iron or steel construction. These two features provide a surprising ease of sharpener operation. To maintain this ease for life, moreover, all anti-friction bearings are completely sealed against entry of dust.

Where floor space is at a premium, a special roller curtain design (to protect ways of machine) enables, at slight additional cost, a reduction of 6 ft. in total floor space required for the machine when sharpening maximum length broaches.

Also available as extra equipment are double-ratio micrometer hand wheels to control feed to the ten-thousandth of an inch. Makes possible maintaining identical step per tooth in regrounding broaches.

**colonial** **BROACH COMPANY**  
DETROIT 13, U.S.A.

*Broaches*  *Broaching Machines - Broaching Equipment*



## Industrial Controls Backed by Military Proposed by Brookings

Washington

• • • Most of the economic plans that have been suggested to insure the world against future German and Japanese aggression are inadequate and impracticable, but certain industrial controls, if backed by joint military force of the United Nations and their associates, may be effectual.

Such is the conclusion of a study, "The Control of Germany and Japan," made public by the Brookings Institution. Its authors are Dr. Harold G. Moulton, president of the Institution, and Dr. Louis Marlio, French economist and industrialist.

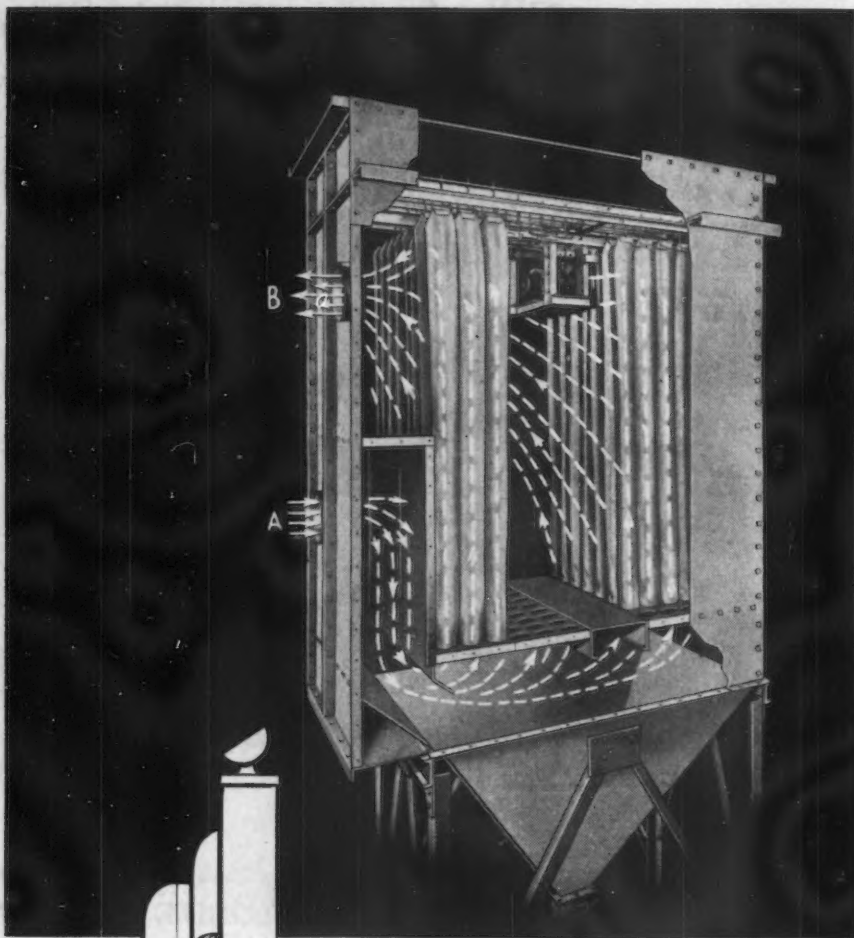
The study also concludes that political boundary readjustments, or outright dismemberment in the case of Germany, are likely to be as ineffectual as most of the economic controls which are examined.

The study is concerned solely with the prevention of aggression by each of the two present enemy countries. The control of these countries is regarded as the first essential in the development of any general world peace system. Inasmuch as current discussions of peace enforcement usually center on economic control devices, these possibilities are explored extensively.

It is out of the question to destroy the industrialism on which war powers rest, for neither Germany nor Japan could support its population as an agricultural nation. An attempt to block war preparations by a system of direct and general economic supervision would require a permanent army of foreign controllers whose presence would be a source of perpetual tension and criticism; it could not fail to be a continuous impediment to production and international trade. An indirect and partial control system would be quite inadequate.

The study investigates the possibilities of control not only through restriction on the importation of raw materials, but also through direct supervision of key industries, such as oil, metals, transportation, and electric power. While key industry controls offer somewhat greater possibilities, even these would not ensure safety. Moreover, the moment there was revolt against economic restrictions military measures would become necessary.

The military control plan here proposed would not require permanent



## Trapping an Invisible Enemy

DUST is the invisible enemy that causes excessive maintenance, slows down the productivity of workers and endangers their health. Whether you realize it or not DUST is costing you money—perhaps more than you think.

"Dustube" collectors filter the air at a rate from 270 C.F.M. to 47,000 C.F.M. and more, depending on your dust problem. They meet the most exacting requirements. Tests show collection efficiency by weight, 98% or more. Efficiency by dust count of filtered air\*, less than 10 million particles per cubic foot of air, from 2 to 10 microns in size.

The few moving parts of "Dustube" bag type collectors cut maintenance cost and simplify operation and inspection. A mechanical shaker gently frees dust particles from sides of cloth collection tubes and deposits them in hopper. Since tubes are never taut or in contact with metal sides, their life is long.

"Dustube" collectors combine the essentials of efficiency, simplicity, and low operating and maintenance costs, to give you the right answer to your dust problem. Write for further information.

Our experienced engineering staff is waiting to serve you. American Foundry Equipment Company, 510 S. Byrkit Street, Mishawaka, Indiana.

\*Determined by impinger method.



ARMY  
NAVY  
**AMERICAN dustube**  
dust collectors



# A Country with

60,000,000  
JOBS

IT'S hard to realize that the United States of tomorrow will include about 60,000,000 working men and women. To keep such a labor force gainfully occupied means high-speed, low-cost production to hold prices down and volume up.

In this better, bigger, busier world of tomorrow you can profit by the experienced engineering advice that is one of the most important factors in Acme service. We design and make special tools to operate exclusively on your product and processes. We also manufacture dies, patterns, gages and fixtures. And, we produce to your specifications heat-treated aluminum castings that have no superior in their field.

Acme service to the metal-working industry is complete. Your inquiry will receive prompt attention.

## ACME

*Pattern and Tool Company, Inc.*

DAYTON, OHIO



HEAT-TREATED ALUMINUM CASTINGS...PATTERNS...TOOLS...TOOL DESIGNING...PRODUCTION PROCESSING

# Hard-Faced Conveyor Rollers



## Roll On and On!

Whether on rollers and discs of conveyors handling projectiles, shell cases or bombs, or on other machinery and equipment parts that are subjected to severe service, Coast Metals Hard-Facing provides a protective coating that resists wear and defies hard use and abuse.

Easily applied by standard welding techniques, Coast Metals Hard-Facing can be successfully used on any ferrous metal, including manganese steel, alloy steel, cast iron and chilled iron. Worn parts are quickly rebuilt to original dimensions and made good as new. In fact, such hard-faced parts are made better than new, since they last several times longer. For this reason, many companies today are hard-facing even new parts, and so getting the advantage of hard-facing economies *right from the beginning*.

Our pamphlet, S-101, goes into details. It is a valuable guide on how to make your mud gun screws, tap hole augers, pug mill paddles, gag press hammers, shear blades, guides, rolls, punches and other plant equipment do a better job at less cost. Write for your copy today.

### COAST METALS, INC.

Plant and General Offices: 1232 Camden Ave., S.W. Canton 6, Ohio

Executive Offices: 2 West 45th Street, New York 19, N.Y.

**COAST METALS**  
*hard-facing  
weld rods*

MAKE YOUR EQUIPMENT LAST LONGER

armies of occupation or continuous internal policing. With Germany and Japan once disarmed, and an adequate system to detect war preparations set up, a combined military and naval task force of the controlling nations would be sufficient to provide effective coercion whenever the occasion demanded it.

Nor would this plan entail any loss of American sovereignty or the subordination of our military forces to an international authority charged with the task of policing the entire world. Its application would be confined to the aggressor nations—Germany and Japan.

If the United States were to remain aloof from collective efforts to prevent German and Japanese rearmament two consequences would have to be faced. A vast defense force would be necessary to guarantee this country safety from attack. The cost of maintaining this force with the necessary bases and essential equipment for an indefinite future would be so great as to leave little hope for the stabilization of the nation's fiscal situation. Even at such cost, under modern conditions of technological war, these defense preparations might well prove insufficient.

Second, under such a program of isolationism, it would be necessary for the government to maintain control over the production of many strategic minerals and key industries, and over both export and import trade. Such extension of government control over broad areas of economic life would involve a great modification of our private enterprise system, and would carry the country far along the road to totalitarianism.

### Weirton Announces It Has Magnesium Rolling Program

Weirton, W. Va.

• • • Weirton Steel Co., subsidiary of National Steel Corp., announced this week that it has been rolling magnesium. Weirton claimed to be the first and only steel producer to roll magnesium.

Weirton undertook the rolling of magnesium in January, and magnesium is received by Weirton in 90 lb. slabs, measuring 60 x 9 x 3 in. The slabs are reduced on the 35-in. blooming mill, and then sent to a sheet mill, where by hand work the sheets are reduced to 0.042 in. Finishing operations are conducted at the Steubenville plant, where by precision rolling and burnishing the magnesium sheets are turned out in thicknesses from 0.010 to 0.014 in.

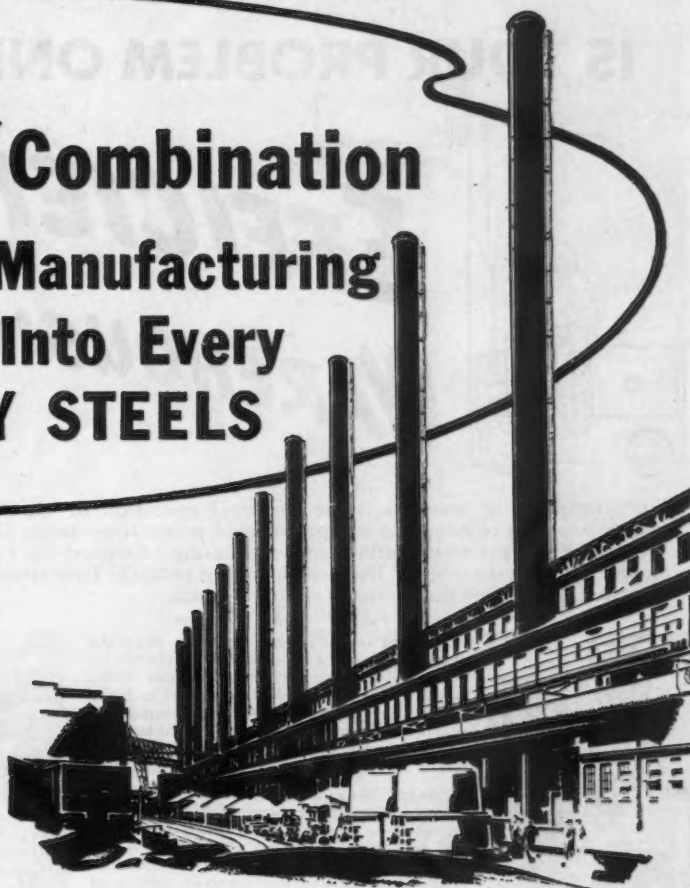


# The *Right* Combination of Materials and Manufacturing "Know-How" Goes Into Every Ton of Our ALLOY STEELS

THE *right* combination of materials and manufacturing "know-how" goes into *every* ton of Wisconsin Alloy Steels, with skilled manpower supervising every operation.

Other factors, too, are important in our steel production. A thorough knowledge of customer requirements is one. Unified control of all operations, from mines to finished product, is another. A series of scrutinizing checks and double-checks, from the time the order is placed until the shipment is on its way to the customer, is another.

This follow-through makes Wisconsin Alloy Steels a **QUALITY** product . . . your assurance of user satisfaction.



## WISCONSIN STEEL PRODUCTS

Open Hearth Alloy and  
Carbon Steel

Rounds, Flats, Squares,  
Bands, Skelp, Screw Steel

Agricultural and Special Shapes  
Structural Angles, Beams,  
and Channels

Universal Plates

Cold Drawn and Turned Shafting

Pig Iron: Malleable, Foundry,  
Bessemer, and Basic

# WISCONSIN STEEL COMPANY

AFFILIATE OF INTERNATIONAL HARVESTER COMPANY

General Offices: 180 North Michigan Avenue

Chicago 1, Illinois

## IS YOUR PROBLEM ONE OF

EFFICIENT  
WAREHOUSING?

Since handling of material is the principal operation in warehousing, the proper selection of handling equipment is of prime importance. Baker Trucks make four distinct contributions to warehousing efficiency: 1. They increase storage space by tiering. 2. They cut handling costs. 3. They speed movement of materials. 4. They do the work of 8 to 10 men.



A leading industrial engineer was given the job of designing a large model warehouse for the world's largest paint manufacturer. Baker Trucks and Tractors were specified to bring about top efficiency in sorting, storing and shipping the more than 100,000 items handled in this warehouse. Fork Truck illustrated at left is stacking drums on pallets three high.

A Baker Material Handling Engineer was called in to make a survey for a large food warehouse. Upon his recommendation a Baker Fork Truck plus a conveyor system was installed. Operating costs were reduced from \$6.68 to \$4.98 per ton—a saving of 25.4%. Gross savings amounted to \$153.00 per week or \$7,956.00 per year. (See illustration at right.)



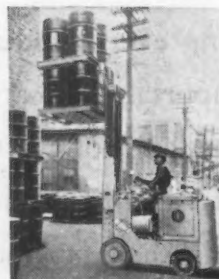
Carloading and unloading is an important warehouse function. The Baker Hy-Lift Truck with telescopic uprisings, (see illustration at left) enters a box car door with ease and tiers material inside the car, conserving shipping space. Savings in loading operations are reported as high as 75% over former methods.

A large chemical manufacturer supplements his inside storage with yard storage of large drums. The Baker Fork Truck (right) is stacking the fourth and fifth tier of drums to conserve space. The same truck is also used to tier pallet loads of bulk materials in sacks inside the warehouse, and for loading products in box cars or highway trucks.



A printer and publisher faced with the need for doubling his storage space avoided additional warehouse rent by installing a Baker Hy-Lift Truck Tiering skid-loads of paper stock, books and magazines multiplied the effectiveness of available space and on rental savings alone paid for his truck in 18 months. (Left)

A large stevedoring company uses Baker Crane Trucks to move crated machinery, motor cars, newsprint rolls, paper pulp and other manufactured products in warehouse and on or off shipboards in the quickest possible time and at the lowest cost. This company has reduced handling costs 18% to 20% through the use of Baker Trucks. (Right)



## WRITE FOR YOUR COPY

Plant and production managers, traffic managers, superintendents, purchasing agents and any others concerned with material handling will find the new Baker Catalog No. 52 a valuable reference.

BAKER INDUSTRIAL TRUCK DIVISION  
of The Baker-Raulang Company

2175 WEST 25th STREET

CLEVELAND, OHIO

In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

Crosley to Hold Its  
First Sales Meeting  
Since Early in 1941

## Cincinnati

••• Looking forward to the coming resumption of production of civilian goods, members of the distributor organization of The Crosley Corp. from all parts of the nation have gathered here this month in a series of three 3-day "Crosley C-Day" sales conferences. They were the first since 1941.

Crosley sales and engineering officials discussed with the visiting distributors some of the Crosley civilian products which will be available as soon as peace-time production gets the green light. These are, fundamentally, the products that Crosley was building when war came.

R. C. Cosgrove, vice-president and general manager, Crosley manufacturing division, welcomed the Crosley distributors to the sessions which began on Sept. 7, Sept. 11 and Sept. 14, and entertained them at his home in East Walnut Hills.

J. H. Rasmusson, Crosley commercial manager, was in charge of the conference sessions, which were addressed by Crosley sales, engineering, advertising and merchandising executives, at the Netherland-Plaza Hotel.

Inspection trips were made to the various Crosley plants in Cincinnati and to the Crosley plant in Richmond, Ind. The Crosley Shelvador refrigerator and the Crosley Floating Jewel Tone radio receivers were featured in the conference demonstrations. The third day of each of the conferences was devoted to small group meetings between the distributors and individual Crosley executives.

To Hold Annual Conference  
On Electric Furnace Steel

## Pittsburgh

••• The second annual conference on electric furnace steel, sponsored by the Electric Furnace Steel Committee of the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers will be held on Oct. 5 and 6 at the William Penn Hotel, Pittsburgh.

The meetings of the conference will deal with both acid and basic electric furnace practice in the manufacture of steel for ingots and castings. Developments in the fields of furnace equipment, refractories, and metal reducing will be discussed by various leaders in these fields. The program



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## ***You Name It!***

**W**HAT are they . . . strange objects from another world? Creations of an artist's wild imagination? Not at all! Actually, they are U. S. Army nurses huddled under special gas-repellent capes designed to guard their skin against contamination should the enemy use gas!

But how are these capes made gas-repellent? The answer is a special Cellophane with high moisture content laminated to thin cloth. At the Dobeckmun Company, a leading processor of this special Cellophane, several methods of adding the required moisture had been tried without success—when a DeVilbiss engineer arrived on the scene.

He found that two DeVilbiss Spray Guns, placed above a processing machine, sprayed just the right amount of moisture over the unwinding Cellophane—quickly and uniformly. Thus, the same DeVilbiss equipment that has made an outstanding record for high-speed

painting and coating of all kinds of war materiel removed another bottleneck on the road to Victory.

But licking such unusual problems is no new experience to DeVilbiss engineers. Making camouflage blankets of chicken feathers, spraying pumice to remove solder stains from watches, adding vitamins to cereals, supplying unfailing air to Navy divers . . . these are only a few of the "tough nuts" DeVilbiss men have recently cracked. This versatility is based on the fact that the four DeVilbiss lines—spray equipment, exhaust systems, air compressors, hose and connections—provide DeVilbiss engineers with products or combinations of products to solve almost any problem in the use of air. Call a DeVilbiss engineer next time *you* have one and see for yourself!

**THE DEVILBISS COMPANY, TOLEDO 1, OHIO**

Canadian Plant: Windsor, Ontario

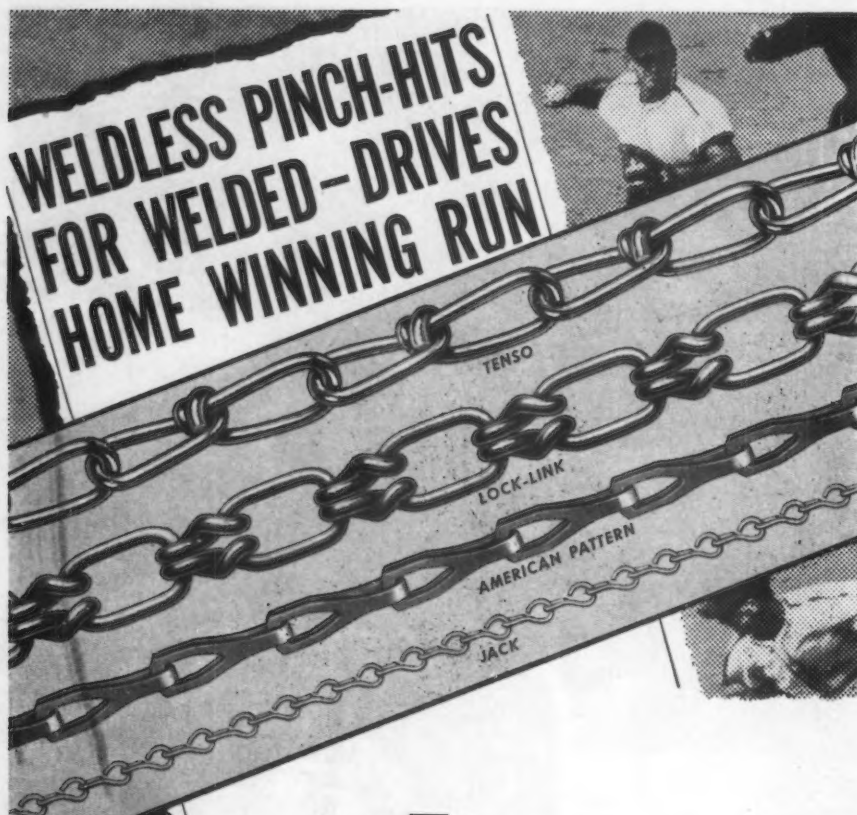


# **DEVILBISS**

## *Spray Systems*

**SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS**

# WELDLESS PINCH-HITS FOR WELDED—DRIVES HOME WINNING RUN



**T**he smart ball club manager never overlooks a chance to win—with regulars or subs. • The winning industrial manager uses the same strategy. Today, many of them, who are short of light welded chain, are applying the heavier types of weldless as pinch-hitters. • The four types of American Weldless Chain shown above have surprised engineers and operating executives with their strength, their endurance, their adaptability to a variety of new jobs. • Write us for information about the substitution of Weldless Chains for needs formerly filled by Welded Chain, or for manila rope.

## AMERICAN CHAIN DIVISION

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland

AMERICAN CHAIN & CABLE COMPANY, INC.  
BRIDGEPORT • CONNECTICUT



*In Business for Your Safety*

## FEATURE CONTINUATIONS

is arranged so that in addition to the prepared papers on each subject, an oral discussion of all topics is possible, with delegates either commenting or questioning the subjects.

At the annual dinners, on Thursday evening, Oct. 5, the vice-president in charge of operations of Republic Steel Corp. will be toastmaster.

Thursday meetings are all joint acid and basic technical sessions, devoted to the performance and maintenance of equipment and refractories. On Friday, the meetings will be in two groups, of two meetings each. The basic steel meetings will cover melting and oxidizing and refining, deoxidizing and pouring. The acid steel group will discuss control of bath composition and deoxidization.

## Western Steel Industry

(CONTINUED FROM PAGE 73)

tween a lower limit approaching zero and an upper limit which may equal or exceed the cost of construction. The alternatives would be for the government either to operate the plant itself or to maintain it in a standby condition for some possible future wartime use. In case of government operation, any contribution to capital cost would be limited by the economic conditions that would be found in operation.

For some time, the scarcity of Western fabricating plants that will utilize steel from Geneva to supply the extensive market which already exists but which is now being supplied by Eastern producers will handicap Geneva's operators. Under such circumstances, it will be necessary that the contract of sale or lease of the plant carry the provision for gradual assumption of financial responsibility for the capital costs.

The relation of capital costs to postwar operation of the Fontana steel plant is in some ways different but in others essentially the same as the Geneva plant. The Kaiser company has borrowed directly from the government and is responsible for the financial obligations of the plant. The economic conditions may require that the government rearrange the financial terms, or the present operating company may be forced to relinquish control—but this should not affect the plant's postwar utilization by someone.

## Alternative Pricing Policies

There are two general alternative pricing policies which may be open  
(CONTINUED ON PAGE 168)



# When Materials and Manpower are Released

# POLLAK MANUFACTURING COMPANY

## Will be equipped to serve you with these Facilities

### RESEARCH AND DEVELOPMENT NOW:

*The Pollak Company maintains an experienced and versatile technical staff for research, development and designing of products and for manufacturing methods.*

**Blanking, Stamping, Drawing** operations ranging from very small precision work to medium heavy work. Maximum depth of draw, 11½"; maximum diameter of shallow stamping, about 45". Materials worked: carbon steel, stainless steel, brass, bronze, monel metal, inconel, aluminum and strong aluminum alloys.

**Sheet Metal Fabricating** from the lightest to ½" in steel and ¼" in aluminum, including tanks and process vessels of all the corrosion resistant metals.

**Welding and Brazing** by oxy-acetylene, oxy-hydrogen and electric arc processes, specializing in the more difficult alloys.

**Electric Spot-Welding and Seam Welding**, ranging from very light work to ¼" material

in steel and to ⅛" material in aluminum.

**Hand Screw Machine Work** from the smallest to 3¼" diameter bar.

**Multi-spindle Automatic Screw Machine Work** from the smallest to 2⅝" diameter bar.

**Lathe, Milling Machine and Drill-Press Work** in capacity required to balance other departments. In addition to the normal general purpose equipment, the company designs and builds special manufacturing equipment when justified by production requirements.

**Electrical Coil Windings** of various kinds ranging from small to medium size.

**Mechanical and Electrical Assembly** ranging from very small precision work to medium heavy. (About one ton per unit is the heaviest ordinarily desired.)

★ ★ ★

### Inspection Standards:

Quality of all manufacturing operations is controlled by an adequate and well equipped Inspection Department.

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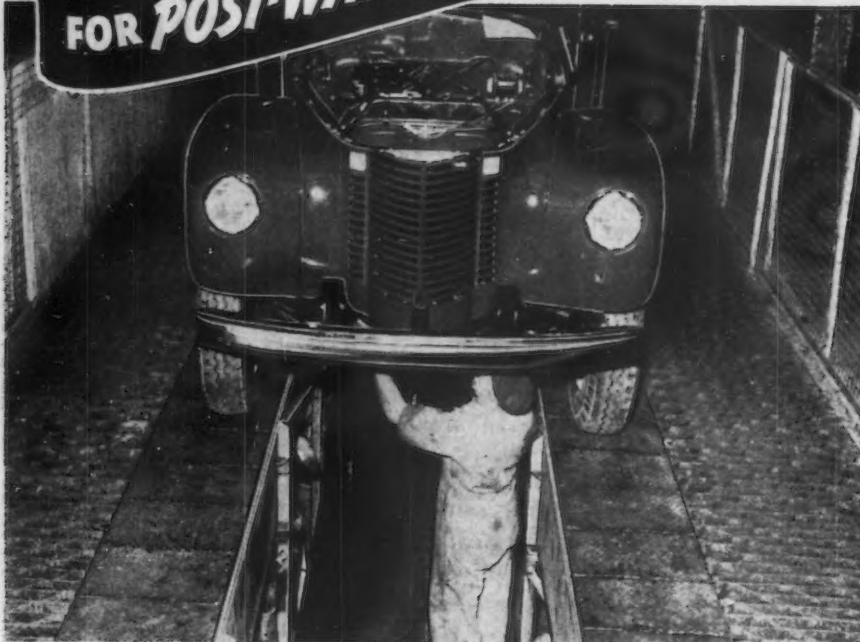


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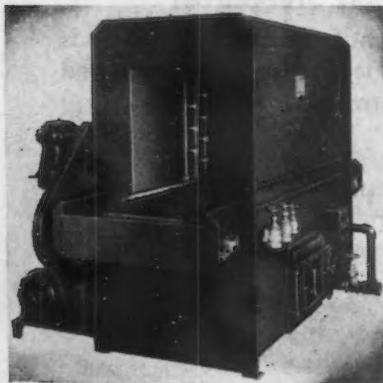
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CONVEYING EQUIPMENT

## Alvey-Ferguson

METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

### FEATURE CONTINUATIONS

for adoption by the postwar operators of the Geneva plant. One of these would take full advantage of the competitive situation to secure for the plant the maximum earnings that may be possible under the competitive conditions that may exist. Under this policy the prices charged in any part of the Western market would be governed primarily by what is necessary to secure the business. The resulting general price pattern would be one with the highest prices in the inland mountain region with prices graduating downward towards the East and towards the Pacific Coast. Prices would be reduced in each part of the market to a point sufficient to give the Geneva plant a satisfactory volume of sales that would be deemed most advantageous by the operators of the plant.

An alternative policy would be based on relative costs and would be characterized by a base price at Geneva that would be graduated upward in all directions by an amount that would be equal to the freight rates from Geneva. The sale price of Geneva products still would be determined by competition from other plants in the Pacific Coast markets and along the eastern fringe of the market that could be advantageously reached from Geneva. At all other points the prices under the second policy would be lower than under the first. Any important reduction of price in the West will stimulate manufacturing and thus enlarge the market for the Western mills. From a long run point of view, therefore, it probably will be in the interest of the operators to follow the second policy, which would enable steel prices to be as low around Geneva as at Eastern steel centers.

### Welded Structures

(CONTINUED FROM PAGE 77)

more can be told and in more detail—show definitely why the use of welded parts is fixed so firmly in the diesel engine field. There are more important considerations involved than the first cost of structural parts.

A collaborative development of a commercial line of diesel engines using welded parts has just been completed with another major builder, who has used welded steel to some degree for years. These parts are shown in Fig. 5. A similar development on a

(CONTINUED ON PAGE 170)



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Chicago Detroit New York

## FEATURE CONTINUATIONS

different type for the same builder is in process.

Despite the unspecified experience of "eleven other" heavy machinery builders, the statement that weldments in general usually exceed the cost of castings by 200 to 250 per cent is open to question.

Along with other welderies, a substantial portion of the growth of Lukenweld, Inc., since its inception some 15 years ago, has depended on direct cost competition with iron castings. On the other hand, there is nothing shocking in a superior material costing more than another to some degree. Materials other than weldments such as steel castings generally cannot be purchased for a price as low as that of iron. A large tonnage of welded steel will continue to be used. If it is indicated by overall engineering considerations, and inescapable, a premium will be paid for these welded steel parts as compared with cast iron.

As a result of this philosophy, the major steam turbine drive builders have used weldments to a very large degree for such structures as drive housings and gear blanks for marine service.

They inaugurated such designs many years before the U. S. Navy "insisted" on weldments. Because they wanted less weight and greater rigidity per pound of weight, and they achieved both. Because they wanted greater predictability and definitely realized it. Finally, because they wanted housings predictably free of residual sand particles which are detrimental to the proper operation of their machines.

These factors have led at least three builders to extend the use of weldments into the turbine casings proper, as Figs. 6 and 7 illustrate.

From this what is the significance of a first-cost comparison of structural parts?

Fig. 8 shows another application of a weldment in "heavy" machinery. It is a railcar truck frame. The important elements in this structure are of a steel plate with a specified tensile strength of 75,000 to 90,000 lb. per sq. in. It is inconceivable that it can be reproduced in cast iron at equal overall weight. If it can, it is obviously over-designed.

Still another interesting and efficient application of a weldment is shown by Fig. 9. In several industries—paper-making, food, chemical,

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### FEATURE CONTINUATIONS

and textile—these dryers or drums are important parts of processing equipment. Traditionally they were of cast iron.

Weldments entered the dryer field about 10 years ago, somewhat as an engineering necessity. In the application illustrated in Fig. 9, a prime consideration was weight reduction. The construction of the upper floors of the building in which this equipment was to be housed imposed a restriction on weight, which meant limiting production speed. Through welded steel design a weight reduction of 23 per cent was achieved.

The type of dryer roll shown on Fig. 10 was developed on the fundamental premise of obtaining drying capacity at maximum rate. Simply stated, the more weight required per square foot of drying area the less drying area available. Structurally the dryer roll illustrated here, having a surface wall thickness of 7/16 in. when polished, was designed to carry a pressure of 100 lb. per sq. in., with the diameter of the roll maintained within a very close tolerance in operation.

The type of construction evolved for this dryer circulates the steam in a "jacket," composed of an outer and inner wall with narrow space between. The heating medium, steam in this instance, is carried through the spokes at one end, circulated through the "jacket" and exhausted through the spokes at the opposite end. Steam consumption per hour was lowered 40 per cent by this weldment.

The design of this dryer roll is in contrast to the traditional type wherein the drying cylinder is simply a barrel with the heating medium circulating throughout a much greater area in a comparatively inefficient manner.

Such dryer rolls for more modern installations are being designed currently to operate at a pressure of 250 lb. per sq. in.

Drying machines traditionally and, of necessity, used cast iron rolls, but about 10 years ago builders investigated the possibilities of converting them to weldments. The resulting conversion to weldments was based on engineering considerations and not on initial production costs.

Certainly it would not have been good engineering to have investigated the possibilities by saying to the weldery: "Cast iron dryers cost us so much. Can you give us a welded steel dryer for the same price or less?"

Fig. 11 showing one-half of a ma-

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## Strenes METAL DRAWING AND FORMING DIES

chine part, which when completed is one single circular piece, is a very effective answer to the general engineering question of—why a weldment or why a casting?

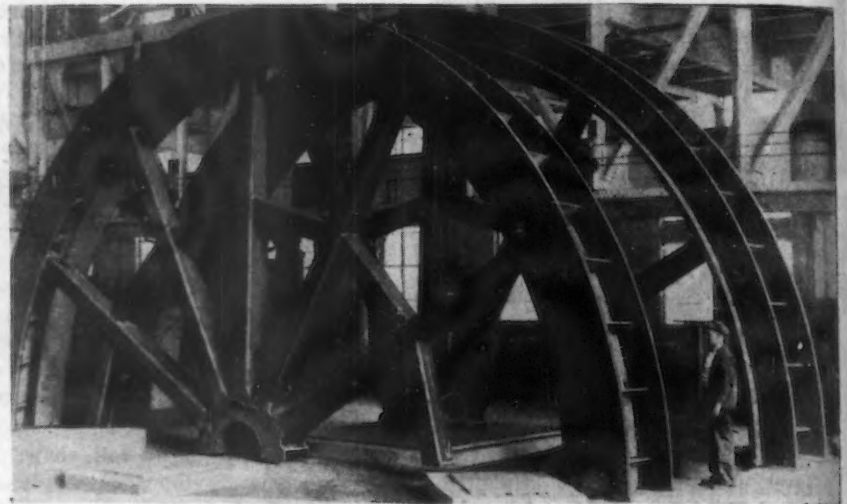
The builder of the machine, of which this piece is a vital part, approached the weldery with a series of questions on first cost, maximum rigidity per pound of weight, and predictability.

In analyzing "first cost" in this instance, any possible design as a casting would involve a comparatively large number of small castings to obtain a reasonable size in the finished piece.

As shipped in the rough from the iron foundry the assortment of cast parts *possibly* would have cost less than the two piece weldment, which was shipped in halves because of its size when assembled.

However, the only justifiable cost comparison is between a casting, assembled with innumerable machined, fitted and bolted joints and the weldment illustrated.

A natural reaction to a structure of this type is "Of course, it should be a weldment, why bring it up?" This



**FIG. 11**—Circular pot chuck used in slotting teeth of forged internal castings, which rotate turret which support 16-in. guns on battleships. This chuck measures 33 ft. 7 in. outside diameter by 3 ft. 6 in. in height, weighing 96,200 lb. The pot chuck had to be made in two pieces because of the impossibility of shipping such a large structure. It was welded into a completed assembly after delivery to the user.

part, however, *was* designed as a casting when the weldery began considering it.

The second question, of relative rigidity, need hardly be considered

here: first, the basic material used provided a modulus of elasticity of 29,000,000; second, the steel plate was disposed in a manner controlled by a consideration of moment of inertia.

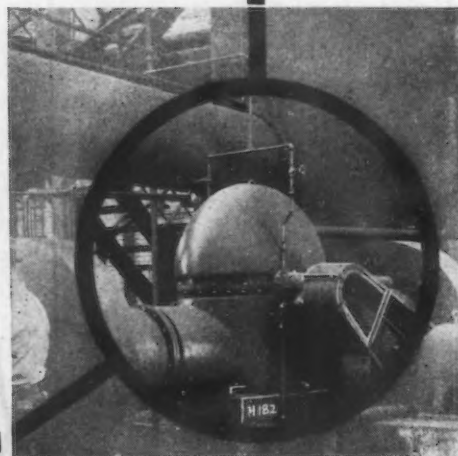
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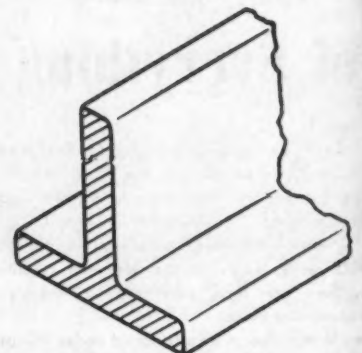
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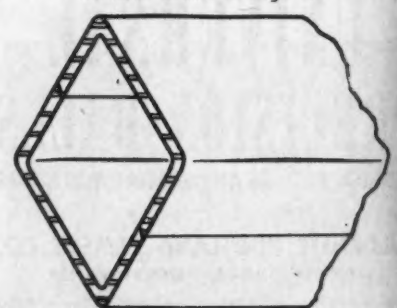


**FIG. 12**—Initial design of member in cast iron.

It was *not* controlled by the practicality of foundry limitations.

As an instance of this, Fig. 12 shows comparative cross sections of the radial arms in the piece. The cast

**FIG. 13**—A final design in welded steel of member shown in Fig. 12.





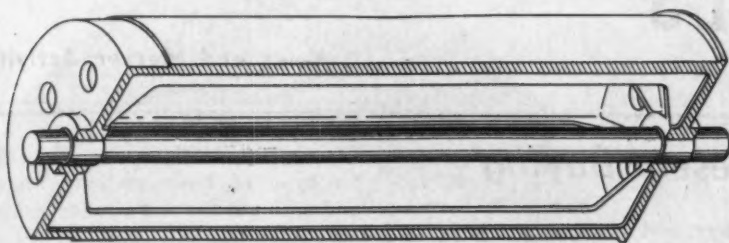


Fig. 14—Typical design of cast iron hoist drum. Separate shaft machined separately.

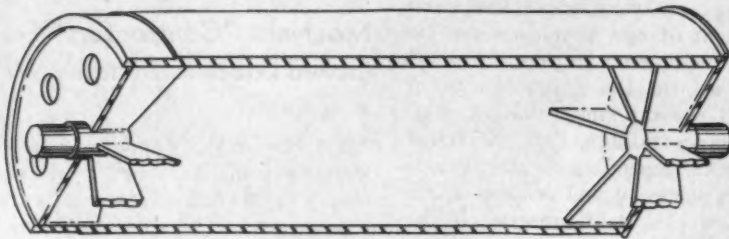


FIG. 15—Alternate design in welded steel of drum in Fig. 14, showing "stub shafts" welded as integral part of drum and machined with O.D. grooving.

section shown was specified in the original design by the machine builder, and hence was presumably dictated by foundry practice. The other section, Fig. 13, was recommended by the engineering department of the weldery, and eventually adopted.

Fig. 14 shows another comparison between a weldment and a casting. Traditionally, hoist drums have been of cast iron. At times, in certain sizes, steel castings have been used. In recent years a large number of welded steel hoist drums have been made—this is "heavy" machinery. Welded steel drums are used presumably because they are cheaper, for the weldments simply have duplicated the design of cast iron hoist drums. Full advantage of the freedom offered by welding has not been taken.

Fig. 15 shows an alternative construction, with the elimination of this added weight and machining cost of the inner portion of the drum shaft, as

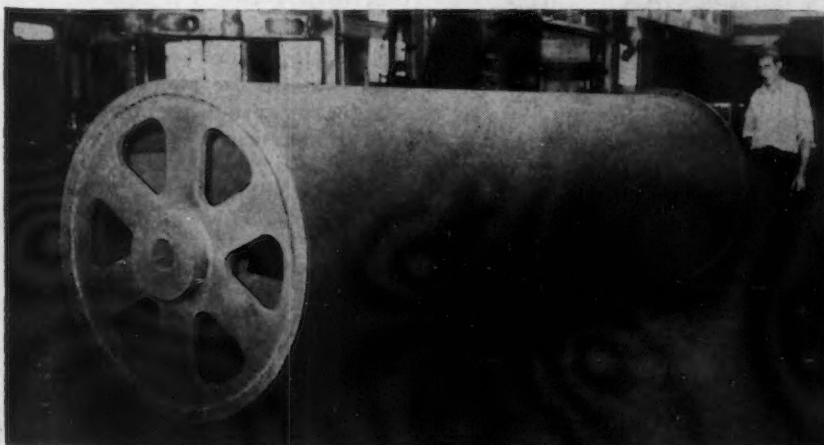
well as the costs of boring the drum to receive the shaft and of pushing the shaft into the drum.

Hoist builders like this welded design and there is little doubt that it will be utilized. Fig. 16 shows a typical welded hoist drum.

With the cost factors discussed in this article, is it reasonable for an engineer to compare directly the cost of cast iron construction with welded construction? Should he not first ask himself, "Have I taken full advantage of the scope of either process?"

Additional instances of intelligently applied weldments could be added to this list. But those chosen are believed to have encompassed sufficiently broad applications of weldments in heavy machinery to prompt the reader to deliberate carefully before arriving at a decision based on the unspecified experience of "eleven other builders of heavy machinery."

FIG. 16—Typical welded steel hoist drum. This drum measures in overall dimensions 4 ft. 6½ in. O.D. by 17 ft. 3 in. in length, including journals, and weighs 23,000 lb.



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# MACHINE TOOLS

... News and Market Activities

## Postwar Use Dominates Present Buying

### Cleveland

••• There is no doubt that the machine tool industry as a whole has had, productive-wise at least, a very satisfactory past five years. The gloom that settled over the industry about a year ago because of the fear that ordering of machine tools might drop drastically as war plans were completely fitted out never materialized, for as soon as one big war tooling job was finished another rose to take its place. Consequently, tool builders have been kept busy for at least five years tooling up the United States war machine.

Now the industry is casting its collective eye on postwar business and rapidly getting underway on the construction of postwar machine tools. Postwar planning by machine tool using industries has effected an easy transition. Buyers of machine tools today are ever so cautious in their specifications so as to buy the machine that, in addition to doing the war job that needs to be done now, will fit into postwar production.

Machine tool builders and dealers estimate that at least 50 per cent of the new orders coming in now, and business is very good, are for equipment that will be used in peace time production. In some instances, the orders are for equipment that is being bought specifically for postwar production while in other instances the equipment will be used now on

war orders and later on civilian orders.

Deliveries on standard machine tools are now very good, and some 90 per cent of new purchases are for standard equipment. Turret lathe deliveries are in the neighborhood of 10 to 14 weeks; small millers, four weeks; large millers, "off the floor" to 10 weeks, depending on size; grinders, both universal and centerless, six to eight weeks; drill presses, off the floor to four weeks; planers, eight to 10 weeks; shapers, stock to four weeks; and boring mills, eight to 10 weeks.

As to hydraulic equipment, it is a different story. Such products as utilize hydraulic systems are considerably tighter. Hydraulic presses, 100 tons and over, are running about 16 weeks on deliveries, and other hydraulic equipment deliveries average between 20 and 24 weeks. Likewise, small motors are very difficult to get, with standard motor deliveries running 16 to 20 weeks. Any off-standard voltage equipment prolongs that delivery schedule.

In line with postwar purchasing, many companies are now beyond the planning stage and are actually ordering postwar machine tools. General Motors recently placed a very large order for screw machines. Murray Ohio Corp. is ordering machinery for manufacturing bicycles. A commercial plastic molder in this area has also placed orders for several injec-

tion molders for postwar use. With this type of business plus what is coming in yet for war production, machine tool builders look for a busy period in the months to come.

## Machinist "Contractors" Game Called Labor Pirating by WMC

### Akron, Ohio

••• The War Manpower Commission, through its director at Akron, Harry C. Markle, pointed its guns at a new method of pirating labor, allegedly being practiced by machine shops in this acute manpower shortage area.

The racket is quite simple but very effective, according to Markle. Machine operators are hired away from jobs in the guise of a "private contractor." The worker is asked to bid on each piece of work he handles, and the employer rents the machine to the operator to perform the work.

War Manpower regulations indicate that a man can leave a job without a certificate of release if he is going into business for himself.

The machine shop operator, likewise, does not technically violate rules of the War Labor Board wage ceilings, because jobs are paid for on a job rate basis, with bids on the completed work and machine rental for doing that work.

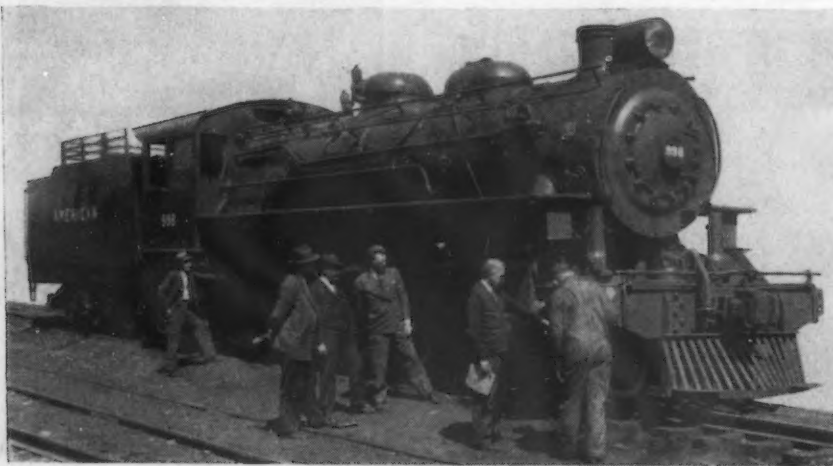
It was pointed out that WMC and WLB are ignoring these technicalities because the intent of the racket is so obvious. If permitted to continue and grow, such practices might well have a very drastic effect on wage and labor stabilization.

## Current Volume Good

### Cincinnati

••• Bookings of District machine tool manufacturers while off from the heavy rate of the late spring are in satisfactory volume. In fact many indicate optimism over the immediate future since current volume is good. Backlogs are melting but the rate has declined as a result of the heavy ordering in early summer. Production schedules are being held at capacity, although manpower is still a No. 1 problem. One or two plants that were about to convert to more direct war production have temporarily sidetracked the program to get pressing new tool orders shipped.

**WOODBURNER CHOO CHOO:** In Pittsburgh, officials of the H. K. Porter Co., Inc., inspect a large, woodburning, narrow-gauge locomotive recently completed by the company. Weighing 229,000 lb. with tender, the engine will go into service in French equatorial Africa.





If it's a gear — BRAD FOOTE  
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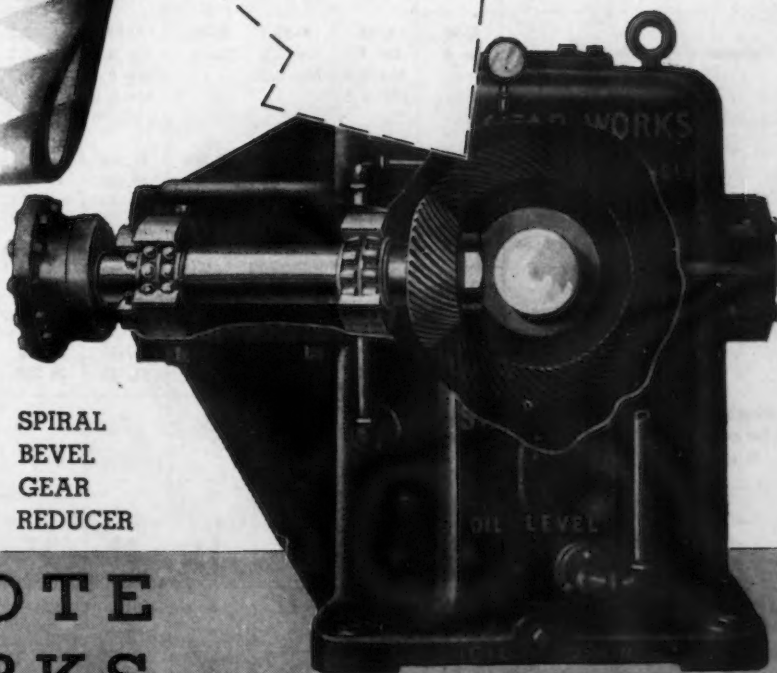
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Speed reduction unit shown in illustration — ratio  $1\frac{3}{4}$  to 1 — 75 H. P. — 500 R. P. M. spiral bevel gear.

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# NON-FERROUS METALS

... News and Market Activities

## Run Tests on Sintered Aluminum

• • • Several aircraft manufacturers have established laboratories for the study of sintered metal powder parts. Data have now been released by the Glenn L. Martin Co. and the Boeing Aircraft Co. on tests conducted on sintered aluminum alloy test bars prepared by the Hardy Metallurgical Co. of New York City.

Progress in the development of aluminum metal powder parts has been retarded to some extent by the relative economy with which aluminum may be fabricated by die casting or permanent mold casting. However the Amplex Div. of Chrysler Corp. is making porous bearings of aluminum powder that are said to compare

favorably in performance with their bronze Oilite bearings. It is anticipated by the Hardy Metallurgical Co. that aluminum metal powder may be suited for the production of certain aircraft bearings and non-structural parts.

### Aluminum

• • • Supplies of aluminum scrap are much larger than can be absorbed by ingot producers. This condition has prevailed for months but is rapidly growing more acute. Market prices of remelted ingot have dropped rapidly with increasing supplies of scrap. In the last few days, prices have been reduced by another  $\frac{1}{4}$  to  $\frac{1}{2}$ c. per lb.

High grade remelted ingot is now sold at 12c. per lb., only  $\frac{1}{2}$ c. below ceiling, but all other ingot grades are sold at greater differentials from ceilings. No. 12 foundry and piston alloys have dropped  $\frac{1}{2}$ c. to 10.00c. per lb. This represents a differential from ceilings of 2c. per lb. All grades of steel deoxidizing aluminum are down  $\frac{1}{2}$ c. Prices range from 7.00 to 10.50c. per lb. as compared with ceilings of 11c. to 12 $\frac{1}{2}$ c. per lb.

### Zinc

• • • Restrictions on the use of zinc and zinc products have been modified by amendment Conservation Order M-11-b.

Such items as washing machines and vacuum cleaners and sweepers have been removed from the prohibited list for use when production is permitted again.

Restrictions on the use of zinc or zinc products for protective coating or plating (other than paint) except for articles prohibited are removed. The order previously permitted use for protective coating or articles not on List A of not more than 60 per cent of the zinc or zinc products used by a person for this purpose during 1941.

### Copper

• • • Although some commitments for primary copper for October delivery are lower than in recent months, others are for increased amounts that tend to make up the difference in requirements. Therefore consumption of primary copper in October should not be significantly less than in recent months. Supplies of copper and copper base scrap continue easy. The Senate and House conferees have presented a compromise bill on disposal of surplus war property for Congressional approval. The bill contemplates withholding from sale for a period of 15 months strategic metals and minerals. It provides for administration of surplus property disposal by a three-man board. Mr. W. L. Clayton, present administrator by executive appointment, has resigned and will not accept appointment under the bill since he considers certain requirements to be unworkable.

Aluminum Metal Powder Test Bars Strength and Ductility

Aluminum Alloy No.		Glenn L. Martin Co.			Boeing Aircraft Co.		
		195	17 S	A 17 S	195	17 S	A 17 S
Powder Mix No.		HB	HC	HD	HB	HC	HD
Composition—per cent		Al-96 Cu- 4	Al-95 Cu- 4 Mg- 0.5 Mn- 0.5	Al-97.2 Cu- 2.5 Mg- 0.3	Al-96 Cu- 4	Al-95 Cu- 4 Mg- 0.5 Mn- 0.5	Al-97.2 Cu- 2.5 Mg- 0.3
Tensile Strength lb. per sq. in.		32,100	49,800 49,000	42,800	37,200 41,500	48,500 40,600	42,900 42,250
	accelerated salt corrosion	29,700 29,800	42,900 45,800	32,100 —	— —	— —	— —
	salt spray 250 hr.	33,200 —	48,800 48,200	40,400 42,000	— —	— —	— —
Yield Strength 2 Per cent offset lb. per sq. in.		22,300 —	35,100 35,900	25,200 —	22,100 23,150	34,100 33,150	25,400 25,250
	accelerated salt corrosion	21,300 21,900	34,000 33,900	24,000 —	— —	— —	— —
	salt spray 250 hrs.	22,700 —	35,800 33,300	25,600 24,800	— —	— —	— —
Elongation per cent in 2 in.		7. —	12 11	22 —	7.8 12.5	8.5 3.1	13.2 10.1
	accelerated salt corrosion	5 6	8 11	6 —	— —	— —	— —
	salt spray 250 hr.	4 —	11 11	13 16	— —	— —	— —

Test bars compressed at 50-60 tons per sq. in. in lubricated dies from powder mixtures of the individual elements, sintered for an hour at 1050 to 1100 deg. F. in dry nitrogen before quenching from 930 to 950 deg. F. in cold water, followed by aging at room temperature.



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(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd. (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	\$17.00
Cadmium, del'd.	90.00
Cobalt, 97-99% (dollars per lb.)	\$2.11
100 lb. or more	\$1.50
Copper, electro. Conn. valley	12.00
Copper, electro. New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.5%, dollars per troy oz.	\$75.00
Iridium, dollars per troy oz.	\$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$105 to \$106.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

### Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	10.00
Aluminum, deoxidizing	7.00 to 10.50
Brass Ingot	
88-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
88-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

### Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	20.37	
Copper, H.R.		17.37	
Copper drawn		18.37	
Low brass, 80%		20.40	20.15
High brass			19.48
Red brass, 85%		20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut		15.01	
Commercial bronze, 90%		21.32	21.07
Commercial bronze, 95%		21.53	21.28
Manganese bronze	24.00		28.00
Phos. bronze, A, B, 5%		36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculey, Olympic or equal		25.50	26.00
Nickel silver, 5%		28.75	26.50
Architect bronze	19.12		

### Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

## NON-FERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

### Copper, Copper Base Alloys

#### OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

#### OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00

#### OPA Group 3†

Yellow brass soft sheet clippings	3.625
Yellow rod brass turnings	3.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25†
Manganese bronze solids	6.25†
Manganese bronze borings	6.50†
Manganese bronze borings	5.50†

#### OPA Group 4†

Refinery brass	4.75*
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\*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. ‡Lead content 0.41 to 1.00 per cent.

### Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

### Other Copper Alloys†

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

### Aluminum

#### Plant scrap, segregated

2s solids	8.00
Dural alloys 14, 17, 18, 24, 25S solids	4.00
turnings, dry basis	2.50
Low copper alloys 51, 52, 61, 63S solids	6.00
turnings, dry basis	4.00

#### Plant scrap, mixed

Turnings, dry basis	2.00
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#### Obsolete scrap

Pure cable	7.00
Old sheet and utensils	5.00
Old castings and forgings	4.50
Pistons, free of struts	4.00
Pistons, with struts	2.00
Old alloy sheet	3.50

### Magnesium

#### Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	3.00
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#### Mixed, contaminated plant scrap

Grade 1 solids	6.00
Grade 1 borings and turnings	2.00
Grade 2 solids	3.00
Grade 2 borings and turnings	2.00

### Zinc

New zinc clippings, trimmings	6.50
Engravers' lithographers plates	6.50
Old zinc scrap	5.25
Unsweated zinc dross	5.50
Die cast slab	5.00
New die cast scrap	4.95
Radiator grilles, old and new	4.00
Old die cast scrap	3.50

### Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

### Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

## ELECTROPLATING ANODES AND CHEMICALS

### Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25½
Electrolytic, full size	22½
cut to size	30½
Rolled, oval, straight, 15 in. and longer	23¼
Curved	24¼
Brass Cast, 82-20, elliptical, 15 in. and longer	23½
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

### Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots .40.82-41.125	
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc sulphate, 89% crystals, bbls.	6.80

## Lower Quotations Again Rule Markets

••• It is apparent from the district scrap reports that while there are practically no current sales being made, sheer inertia over a long period of time is tending to depress the market. Several districts report that scrap offerings could be bought below prices quoted last week if there were buyers.

The New York and West Coast markets report current sales to bear out this trend. The price of No. 1 heavy melting at New York is now about \$3 below ceiling. A fair tonnage of Southern California heavy melting scrap has also recently sold at \$2 to \$3 below ceiling. Quotations in Pittsburgh and Philadelphia are also down from last week.

Differentials between grades of heavy melting scrap have now been reported in New York after having been rumored for many weeks in districts throughout the country. The sluggishness of the market in recent months has made it possible for buying mills to practically set their own prices.

**PITTSBURGH**—Scrap prices showed further weakness this week by dropping about 50 cents per ton. While some railroad scrap brought higher prices than that shown in the price table, the quantities were very small and the bulk of the sales back up the prices in the range shown. Government and railroad accumulations are presently forcing the market down, coming into the market in very heavy quantities. This scrap is mainly shipyard and arsenal generated material. A meeting is planned in New York on Sept. 22, in order to determine the possibilities of completely discontinuing the OPA price ceiling system on scrap.

**CHICAGO**—Despite some purchases by a leading mill consumer which early last week established prices on principal grades, dealer broker transactions continue to give evidence of further underlying weakness. If these sales later are confirmed in mill purchases, the price trend will be downward but just how much is a moot question. Prices for several railroad grades, including cut locomotive tires, cut bolsters and side frames, angles and splice bars, No. 3 steel wheels and couplers and knuckles must be considered as nominal and on the high side of probable transactions. Quotations for agricultural and railroad malleable likewise are nominal. The lower peg of the cast scrap range represents minimum switching plus brokerage for material of local origin, while

the upper peg represents maximum freight offered by foundry buyers.

**DETROIT**—Buyers seem to feel that their present inventories are adequate to meet all emergencies in view of the war's rapid development, at least until market prices of scrap are stabilized at a lower figure. Activity in this area is marking time, so that listed prices are based upon recent sales.

**CLEVELAND**—All mills are out of the scrap market here on everything except a small amount of blast furnace scrap. With only foundries still in the market, the tendency of the past two or three weeks toward deflated prices continues with No. 1 steel prices dropping \$1.50. This is not an actual buying price, because there have been no sales, but it is a price at which dealers would be quite willing to sell. Foundries remain in the market, but their purchases are not in any great volume. There is expected to be a complete re-establishment of grade differentials as soon as the mills resume buying here, with \$1 off base for No. 2 heavy melting; \$2 off base on No. 2 dealers bundles; and \$1 over base for railroad heavy melting.

**BIRMINGHAM**—An extremely dull market here has yet to show any sign of increased activity. Tonnages offered are being refused and when consumers will be accepting orders again is problematical.

**NEW YORK**—The market in this area is quite slow, but transactions have established the price of No. 1 heavy melting at a dollar below last week's. Moreover the long expected differentials in open hearth grades have also been established. Differentials amount to a dollar a ton per grade, except for galvanized bundles which sell at \$2 below black bundles. There is no differential between No. 2 heavy melting and No. 1 busheling. The market for cast grades remains firm except for heavy breakable and charging box which are off \$1 and \$1.50, respectively. Turnings are not selling now so the prices quoted for them are nominal.

**CINCINNATI**—Steel grades in this area are very slow moving but dealers indicate still a fair volume of demand for cast grades. Trading, however, has been largely between dealers against old orders with the market none too active in this line. Machine shop turnings are reported to be a drug on the market and virtually no sales are reported in this area. While prices remain unchanged, they may be said to be nominal.

**BOSTON**—Bethlehem Steel Co. dominates the market, other Pennsylvania mills still not being interested in scrap. Bethlehem has split prices on open hearth grades, thus contradicting OPA rulings. For No. 1 steel it offers \$12 a ton on cars and for No. 2 \$11. Bro-

kers offer 50c. a ton less. A small tonnage has been moved on this basis thereby establishing the market. All turnings and borings are priced alike. The 2800 tons of unprepared light steel on ground at Braintree, Mass., fetched \$4.38 a ton. Foundry materials hold at ceilings.

**SAN FRANCISCO**—Even ultra-ultra creme-de-la-creme shipyard scrap on the West Coast is reported to be weakening. Navy has been selling from time to time at from \$1 to \$2 below ceiling and a fair tonnage in southern California recently moved from \$2 to \$3 below ceiling. Cupola cast remains firm, and electric furnace grades and steel foundry purchases from shipyards are so far at ceilings. Official figures indicate that Pacific Coast scrap mill and dealer inventories shrank 12,000 tons in August on top of 10,000 tons in July, to aggregate 70,000 tons total shrinkage since the first of the year. Present inventories average 70 days at 80 per cent capacity but some plants are as low as 30 days. Buyers are confident they can replenish on an even lower price basis, but the WPB is concerned and worried.

**ST. LOUIS**—Two steel mills bought heavy melting steel at \$1 below the ceiling price, railroad specialties were off \$2; malleable was easier at \$21 to \$22, and cast grades were being accepted at shipping point prices with a maximum freight ceiling of \$2.50, whereas the freight ceiling a week previously had been \$5. Desire of dealers to liquidate and a freer movement of scrap caused the easier market.

**BUFFALO**—Sales of open hearth scrap reported last week at \$18.25 are said to have involved liquidation by dealers who had overbought on the East coast and who sold under the ceiling rather than hold it in an unsettled market. Grading mostly No. 2, it amounted to several thousand tons. Dealers are generally marking time and restricting incoming material as much as possible to wanted items. Much of the No. 1 open hearth scrap is reported going to foundries, although offerings are not large. Mill consumers still are receiving moderate shipments on old contracts. These include steady supplies by barge canal from the East and a 5000-ton cargo from Detroit. Demand for cast scrap appears adequate to absorb offerings at the ceiling. With so little new business, prices are mostly nominal. The idea of a differential between No. 1 and No. 2 open hearth grades appears to be gaining headway in many quarters.

**PHILADELPHIA**—Consumers are still showing little activity in the scrap market. A few small orders for heavy melting scrap have been made at a new low price of \$16.25. Some brokers here are noting a weakness in the market for cast grades and have accepted orders for heavy breakable cast at \$15 a ton delivered to consumer, and charging box size at \$17.50 a ton delivered. Brokers are expecting scrap orders for October to carry differentials for No. 2 and other open hearth steel scrap grades.



Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4).

### PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. melt.	\$17.50 to \$18.00
RR. hvy. melt.	18.00 to 18.50
No. 2 hvy. melt.	17.00 to 17.50
RR. scrap rails	21.00 to 21.50
Rails 3 ft. and under	23.50
Compressed sheets	17.00 to 17.50
Hand bld. sheets	17.00 to 17.50
Hvy. axle turn.	17.00 to 17.50
Mach. shop turn.	11.00 to 11.50
Hvy. steel forge turn.	17.00 to 17.50
Short shov. turn.	15.00 to 15.50
Mixed bor. and turn.	11.00 to 11.50
Hvy. break. cast.	16.50 plus frt.
Cast iron borings	14.50 to 15.00
No. 1 cupola	20.00 plus frt.
RR. knuck. and coup.	23.50 to 24.00
RR. coll. springs	23.50 to 24.00
Rail leaf springs	23.50 to 24.00
Rolled steel wheels	23.50 to 24.00
Low phos. billet crops	25.00 to 25.50
Low phos. plate	20.50 to 21.00
RR. malleable	ceiling plus frt.

### CHICAGO

Per gross ton delivered to consumer	
No. 1 hvy. melting	\$18.75
No. 2 hvy. melting	17.25 to 17.75
No. 1 bundles	18.25 to 18.75
No. 2 dealers' bndls.	16.25 to 16.75
Bndld. mach. shop.	16.25 to 16.75
turnings	16.25 to 16.75
Galv. bundles (No. 3)	14.25 to 14.75
Mach. shop turnings	10.00 to 10.50
Short shoveling trngs.	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Mix bor. & short turn.	10.00 to 10.50
Low phos. hvy. forge	20.75 to 21.25
Low phos. plates	18.25 to 18.75
No. 1 RR hvy. mltng.	18.75
No. 2 RR hvy. mltng.	17.75
Reroll rails	22.25
Cut rails, 3 ft. and under	21.75 to 22.25
Locomotive tires, cut	23.75 to 24.25
Cut bolsters & side frames	20.75 to 21.25
Angles & splice bars	20.75 to 21.25
No. 3 steel wheels	21.00 to 21.50
Couplers & knuckles	21.00 to 21.50
Cut rails, 2 ft. and under	23.00 to 23.50
Miscellaneous rails	19.75 to 20.25
Std'd stl. car axles	23.50 to 24.00
No. 1 mach. cast	21.34 to 23.00
No. 1 agricul. cast	21.34 to 23.00
Cast iron car wheels	21.34 to 23.00
Hvy. breakable cast	17.34 to 17.84
RR grate bars	16.59 to 18.25
Brake shoes	16.59 to 17.09
Stove plate	20.34 to 20.84
Clean auto cast	21.34 to 23.00
Agricul. malleable	23.34 to 25.00
RR malleable	23.34 to 25.00

### CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$16.50 to \$17.00
No. 2 hvy. melting	16.50 to 17.00
Compressed sheet stl.	16.50 to 17.00
Drop forge flashings	16.50 to 17.00
Mach. shop turnings	9.50 to 10.50
Short shovel. trngs.	13.50 to 14.50
No. 1 busheling	18.00 to 18.50
Steel axle turnings	15.50 to 16.00
Low phos. billet and bloom crops	20.00 to 21.00
Cast iron borings	13.50 to 14.50
Mixed bor. & turns.	11.50 to 12.00
No. 2 busheling	14.00 to 14.50
No. 1 machine cast	20.00 to 26.00
Railroad cast	20.00
Railroad grate bars	15.25
Stove plate	19.00 to 23.00
Rails 3 ft. & under	23.00
Rails 18 in. & under	24.25
Rails for rerolling	23.00 to 23.50
Railroad malleable	22.00
Elec. furnace punch-ings	19.50 to 20.50

### DETROIT

Per gross ton, brokers' buying prices:	
No. 1 hvy. melting	\$12.50 to \$13.00
No. 1 hvy. comp. sh'ts	12.50 to 13.00
No. 2 hvy. melting	12.50 to 13.00
No. 1 bundles	12.50 to 13.00
New busheling	12.50 to 13.00
Mach. shop turnings	6.75 to 7.25
Short shov. turn.	8.75 to 9.25
Cast iron borings	7.75 to 8.25
Mixed bor. and turns	6.75 to 7.25
No. 1 cupola cast	20.00
Charging box cast	17.00 to 17.50
Hvy. breakable cast	14.00 to 14.50
Stove plate	18.00 to 18.50
Flashings	12.50 to 13.00
Low phos. plate	16.50 to 17.00
Automotive cast	20.00

### PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$16.25 to \$16.50
No. 2 hvy. melting	16.25 to 16.50
No. 1 bundles	16.25 to 16.50
Mach. shop turnings	12.50 to 13.00
Shoveling turnings	14.50 to 15.00
Cast iron borings	13.50 to 14.00
Mixed bor. & turns	12.50 to 13.00
No. 1 cupola cast	20.00
Hvy. breakable cast	15.00 to *16.50
Cast, charging box	17.50 to *19.00
Hvy. axle and forge turnings	17.00 to 17.50
Hvy. forge turnings	17.25 to 17.75
Low phos. plate	19.25 to 19.75
Low phos. punchings	19.75 to 20.25
Billet crops	19.25 to 19.75
RR. steel wheels	19.50 to 20.00
RR. coil springs	19.50 to 20.00
RR. malleable	23.64

\*F.o.b. shipping point.

### ST. LOUIS

Per gross ton delivered to consumer:	
Hvy. melting	\$16.50
No. 1 locomotive tires	16.00
Misc. stand. sec. rails	17.00
Railroad springs	17.00
Bundled sheets	15.00
Heavy turnings	12.25
Rerolling rails	21.00
Steel car axles	23.50
Steel rails under 3 ft.	21.50
Steel angle bars	21.00
Cast iron car wheels	20.00
No. 1 machinery cast	20.00
Railroad malleable	\$21.00 to 22.00
Breakable cast	16.50
Stove plate	19.00
Grate bars	15.25
Brake shoes	15.25

Note: Cast grades f.o.b. Shipping Point.

### BIRMINGHAM

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$15.00 to \$15.50
No. 2 hvy. melting	15.00 to 15.50
No. 2 bundles	14.00 to 14.50
No. 1 busheling	12.00 to 12.50
Scrap rails	15.00 to 15.50
Rails for rerolling	18.00 to 18.50
Rails 3 ft. & under	18.00 to 18.50
Angle & splice bars	17.00 to 17.50
Long turnings	5.00 to 5.50
Cast iron borings	7.00 to 7.50
Steel axles	15.00 to 15.50
Stove plate	17.00 to 17.50
Bar Crops and plate	17.00 to 17.50
Structural and plate	17.00 to 17.50
No. 1 cast	20.00 to 21.00
Cast iron carwheels	13.00 to 13.50

### YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$17.50 to \$18.00
No. 2 hvy. melting	17.50 to 18.00
Low phos. plate	17.50 to 18.00
No. 1 busheling	17.50 to 18.00
Hydraulic bundles	17.50 to 18.00
Mach. shop turnings	10.00 to 11.00
Short shovel. trngs.	14.00 to 15.00
Cast iron borings	14.00 to 15.00

### NEW YORK

Dealers' buying prices, per gross ton, on cars:	
No. 1 hvy. melting	\$12.25 to \$12.75
No. 2 hvy. melting	11.25 to 11.75
No. 1 busheling	11.25 to 11.75
Hyd. comp. black bundles	10.25 to 10.75
Hyd. comp. galv. bundles	8.25 to 8.75
Hvy. breakable cast	15.50
Charging box cast	17.50
No. 1 cupola cast	20.00
Stove plate	19.00
Clean chem. cast bor.	14.33
Mach. shop turnings	8.75 to 9.00
Mixed bor. & turns	8.75 to 9.00
Clean auto cast	20.00
Unstrip. motor blks.	17.50
No. 1 cupola cast	20.00

### CINCINNATI

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$18.50 to \$19.50
No. 2 hvy. melting	18.50 to 19.50
No. 1 bundles	18.50 to 19.50
No. 2 bundles	18.50 to 19.50
Mach. shop turnings	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	13.50 to 14.50
Mixed bor. & turns	12.50 to 13.50
No. 1 cupola cast	21.00
Hvy. breakable cast	16.50
Low phos. plate	21.00 to 22.00
Scrap rails	21.00
Stove plate	17.00 to 18.00

### BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$18.25 to \$19.25
No. 1 bundles	18.25 to 19.25
No. 2 bundles	18.25 to 19.25
No. 2 hvy. melting	18.25 to 19.25
Mach. shop turnings	13.00 to 14.25
Shoveling turnings	16.25
Cast iron borings	15.25
Mixed bor. & turns	14.25
No. 1 cupola cast	20.80 to 22.50
Stove plate	19.80 to 21.50
Low phos. plate	21.75
Scrap rails	20.75
Rails 3 ft. & under	22.75
RR steel wheels	23.75
Cast iron car wheels	20.00
RR coll. & leaf sprgs.	23.75
RR knuckles & coup.	23.75
RR malleable	22.00
No. 1 busheling	19.25

### BOSTON

Dealers' buying prices per gross ton, f.o.b. cars	
No. 1 hvy. melting	\$11.50 to \$12.00
No. 2 hvy. melting	10.50 to 11.00
Bundled skeleton	9.50 to 10.00
Turnings, shoveling	7.00 to 7.50
Turnings, regular	7.00 to 7.50
Mixed bor. & turns	7.00 to 7.50
Delivered to fdr. per gr. ton	
Breakable cast	21.57 to 21.87
Stove plate	20.00 to 23.51
Machinery cast, truck	21.00 to 23.51

### CALIFORNIA BASING POINTS

Per gross ton delivered to consumer:	
San Francisco and Los Angeles	
No. 1 hvy. melting	\$16.00 to \$16.75
RR hvy. melting	16.00 to 16.75
No. 2 hvy. melting	15.00 to 15.75
Mach. shop turnings	4.50 to 7.00
No. 1 cupola cast	21.00 to 25.00
No. 2 bales	14.00 to 14.75
No. 3 bales	10.00 to 10.75
Electric furnace 1 ft. under	17.00 to 19.50

### Seattle

No. 1 hvy. melting	\$14.50
RR hvy. melting	14.50
No. 3 bundles	12.50
No. 1 cupola cast	21.00 to 23.00
Electric furnace, 1 ft. under	16.00 to 17.00

# Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)					Pig Iron: (Per Gross Ton)				
	Sept. 19, 1944	Sept. 12, 1944	Aug. 15, 1944	Sept. 21, 1943		Sept. 19, 1944	Sept. 12, 1944	Aug. 15, 1944	Sept. 21, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10	No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$25.84
Cold rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace...	24.00	24.00	24.00	24.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti...	25.11	25.11	25.11	24.68
Hot rolled strip	2.10	2.10	2.10	2.10	No. 2, Birmingham	20.38	20.38	20.38	20.38
Cold rolled strip	2.80	2.80	2.80	2.80	No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern Pa...	25.34	25.34	25.34	25.39
Plates, wrought iron	3.80	3.80	3.80	3.80	Basic, Valley furnace...	23.50	23.50	23.50	23.50
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00	Malleable, Chicago†	24.00	24.00	24.00	24.00
<b>Tin and Terne Plate:</b> (Dollars Per Base Box)					Malleable, Valley	24.00	24.00	24.00	24.00
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00	L. S. charcoal, Chicago..	37.34	37.34	37.34	31.34
Tin plate, electrolytic...	4.50	4.50	4.50	4.50	Ferromanganese†	135.00	135.00	135.00	135.00
Special coated mfg. ternes	4.30	4.30	4.30	4.30	†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.				
<b>Bars and Shapes:</b> (Cents Per Lb.)					<b>Scrap:</b> (Per Gross Ton)				
Merchant bars	2.15	2.15	2.15	2.15	Heavy melt'g steel, P'gh.	\$17.75	\$18.25	\$20.00	\$20.00
Cold finished bars	2.65	2.65	2.65	2.65	Heavy melt'g steel, Phila	16.375	17.00	18.75	18.75
Alloy bars	2.70	2.70	2.70	2.70	Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
Structural shapes	2.10	2.10	2.10	2.10	No. 1 hy. comp.sheet, Det.	12.75	14.75	17.85	17.85
Stainless bars (No. 302)	24.00	24.00	24.00	24.00	Low phos. plate, Youngs'n	17.75	20.50	22.50	22.50
Wrought iron bars	4.40	4.40	4.40	4.40	No. 1 cast, Pittsburgh...	22.50	22.50	20.00	20.00
<b>Wire and Wire Products:</b> (Cents Per Lb.)					No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
Plain wire	2.60	2.60	2.60	2.60	No. 1 cast, Ch'go.	22.17	22.17	20.00	20.00
Wire nails	2.55	2.55	2.55	2.55	<b>Coke, Connellsville:</b> (Per Net Ton at Oven)				
<b>Rails:</b> (Dollars Per Gross Ton)					Furnace coke, prompt...	\$7.00	\$7.00	\$7.00	\$6.50
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00	Foundry coke, prompt...	8.25	8.25	8.25	7.50
Light rails	40.00	40.00	40.00	40.00	<b>Non-Ferrous Metals:</b> (Cents per Lb. to Large Buyers)				
<b>Semi-Finished Steel:</b> (Dollars Per Gross Ton)					Copper, electro., Conn...	12.00	12.00	12.00	12.00
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	Copper, Lake	12.00	12.00	12.00	12.00
Sheet bars	34.00	34.00	34.00	34.00	Tin (Straits), New York	52.00	52.00	52.00	52.00
Slabs, rerolling	34.00	34.00	34.00	34.00	Zinc, East St. Louis	8.25	8.25	8.25	8.25
Forging billets	40.00	40.00	40.00	40.00	Lead, St. Louis	6.35	6.35	6.35	6.35
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00	Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
<b>Wire Rods and Skelp:</b> (Cents Per Lb.)					Nickel, electrolytic	35.00	35.00	35.00	35.00
Wire rods	2.00	2.00	2.00	2.00	Magnesium, ingot	20.50	20.50	20.50	20.50
Skelp	1.90	1.90	1.90	1.90	Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 181-189.

## Composite Prices . . .

Starting with the issue of April 23, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 23, 1943, issue.

FINISHED STEEL				PIG IRON				SCRAP STEEL			
	HIGH	LOW			HIGH	LOW			HIGH	LOW	
September 19, 1944...	2.25513c.	2.25513c.	a Lb.	.....	23.61	23.61	a Gross Ton	.....	\$17.625	\$19.17	a Gross Ton
One week ago	2.25513c.	2.25513c.	a Lb.	.....	23.61	23.61	a Gross Ton	.....	\$18.00	\$19.17	a Gross Ton
One month ago	2.25513c.	2.25513c.	a Lb.	.....	23.61	23.61	a Gross Ton	.....	\$19.17	\$19.17	a Gross Ton
One year ago	2.26190c.	2.26190c.	a Lb.	.....	23.61	23.61	a Gross Ton	.....	\$19.17	\$19.17	a Gross Ton
1943.....	2.25513c.	2.25513c.			23.61	23.61			19.17	19.17	
1942.....	2.26190c.	2.26190c.			23.61	23.61			19.17	19.17	
1941.....	2.43078c.	2.43078c.			23.61	23.61			19.17	19.17	
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16			23.61, Mar. 20	23.45, Jan. 2			22.00, Jan. 7	19.17, Apr. 10	
1939.....	2.35367c., Jan. 3	2.26689c., May 16			23.45, Dec. 23	22.61, Jan. 2			21.83, Dec. 30	16.04, Apr. 9	
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18			22.61, Sept. 19	20.61, Sept. 12			22.50, Oct. 3	14.08, May 16	
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4			23.25, June 21	19.61, July 6			15.00, Nov. 22	11.00, June 7	
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10			23.25, Mar. 9	20.25, Feb. 16			21.92, Mar. 30	12.67, June 8	
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8			19.74, Nov. 24	18.73, Aug. 11			17.75, Dec. 21	12.67, June 9	
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2			18.84, Nov. 5	17.83, May 14			13.42, Dec. 10	10.33, Apr. 29	
1933.....	1.95578c., Oct. 3	1.75836c., May 2			17.90, May 1	16.90, Jan. 27			13.00, Mar. 13	9.50, Sept. 25	
1932.....	1.89196c., July 5	1.83901c., Mar. 1			16.90, Dec. 5	13.56, Jan. 3			12.25, Aug. 8	6.75, Jan. 3	
1931.....	1.99626c., Jan. 13	1.86586c., Dec. 29			14.81, Jan. 5	13.56, Dec. 6			8.50, Jan. 12	6.43, July 5	
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9			15.90, Jan. 6	14.79, Dec. 15			11.33, Jan. 6	8.50, Dec. 29	
1929.....	2.31773c., May 28	2.26498c., Oct. 29			18.21, Jan. 7	15.90, Dec. 16			15.00, Feb. 18	11.25, Dec. 9	
					18.71, May 14	18.21, Dec. 17			17.58, Jan. 29	14.08, Dec. 8	
Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.											
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.											
Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.											



# ... Finished Iron and Steel Prices

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire.

Basing Point Product	DELIVERED TO												
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Provo, Utah	Pacific Ports, Cars
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢			2.65¢
Cold Rolled Sheets <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢			3.70¢
Galv. Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢			4.05¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢			4.00¢
Long Ternes <sup>2</sup>	3.80¢	3.80¢	3.80¢										4.55¢
Hot Rolled Strip <sup>3</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢			2.75¢
Cold Rolled Strip <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester=3.00¢)				2.90¢
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢						2.56¢
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢		(Worcester=3.35¢)				3.05¢
Coke Tin Plate, Base Box	\$5.00	\$5.00	\$5.00						\$5.10				5.36¢
.50 Electro Tin Plate, Box	\$4.50	\$4.50	\$4.50						\$4.60				
.75	\$4.65		\$4.65						\$4.75				
Black Plate (29 gage) <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢				4.05¢ <sup>13</sup>
Mfg. Ternes, Special Box	\$4.30	\$4.30	\$4.30						\$4.40				
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth=2.25¢)	2.50¢			2.80¢
Rail Steel Bars <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢			2.80¢
Reinforcing (Billet) Bars <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢			2.55¢ <sup>13</sup>
Reinforcing (Rail) Bars <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢			2.55¢ <sup>13</sup>
Cold Finished Bars <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit=2.70¢)	(Toledo=2.80¢)			2.99¢
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton=2.70¢)				2.80¢
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢	2.45¢	2.60¢	2.65¢	2.32¢
Floor Plates	3.35¢	3.35¢								3.70¢			3.71¢
Alloy Plates	3.50¢	3.50¢								3.95¢			3.70¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem=2.10¢)	2.45¢			2.75¢
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester=3.00¢)				
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester=4.50¢)				
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester=6.35¢)				
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester=8.55¢)				
Bright Wire <sup>14</sup>	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester=2.70¢) (Duluth=2.65¢)				3.10¢
Galvanized Wire									Add proper size extra and galvanizing extra to Bright Wire base				
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester=3.30¢)				3.70¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢							2.95¢

**EXCEPTIONS TO PRICE SCHED. NO. 6**  
**Slabs**—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50.  
**Blooms**—Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Pgh. Steel Co. (reroll) \$38.25, (forging) \$44.25. Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth.  
**Sheet Bar**—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.  
**Billets, Forging**—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto; Phoenix Iron Co. \$47.00 mill. Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50.  
**Billets, Rerolling**—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp., 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1½ x 1½) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.69 Birmingham; Ford Motor Co. \$34 Dearborn, Mich. Geneva Steel Co. \$58.64 f.o.b. Pac. C. Pgh. Steel Co. \$43.50.

**Structural Shapes**—Phoenix Iron Co. \$23.35 basing pts. (export) \$25.00 Phoenixville; Knoxville Iron Co. \$23.30 basing points.  
**Rails**—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., \$45 Pueblo.  
**Hot Rolled Plate**—Granite City Steel Co. \$2.65 mill; Knoxville Iron Co. \$2.25 basing pts.; Kaiser Co. and Geneva Steel Co. \$3.20 Pacific Ports; Central Iron & Steel Co. \$2.50 basing points; Granite City Steel Co. \$2.35 Granite City.  
**Merchant Bars**—W. Ames Co., 10 tons and over, \$2.85 mill; Eckels-Nye Steel Corp., \$2.50 basing pts. (rail steel) \$2.40; Phoenix Iron Co. \$2.40 basing pts.; Sweet Steel Co. (rail steel) \$2.35 mill; Joslyn Mfg. & Supply Co., \$2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bars) \$2.35 Chicago; Knoxville Iron Co. \$2.30 basing pts. Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. \$2.75 f.o.b. Milton, Pa.  
**Pipe Skelp**—Wheeling Steel Corp., Benwood, \$2.05 per cwt.  
**Reinforcing Bars**—W. Ames & Co., 10 tons and over, \$2.85 mill; Sweet Steel Co. (rail steel) \$2.35 mill; Columbia Steel Co. \$2.50 Pacific Ports.  
**Cold Finished Bars**—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/1 freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/1 freight Buffalo to Massfield, Mass. f.o.b. Massfield; Empire Finished Steel

Corp. on allocation outside New England, Buffalo c.f. base plus c/1 freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/1 freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/1 freight Chicago to St. Louis, f.o.b. St. Louis.  
**Alloy Bars**—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Connors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.  
**Hot Rolled Strip**—Joslyn Mfg. & Supply Co. \$2.30 Chicago; Knoxville Iron Co. \$2.25 basing pts.  
**Hot Rolled Sheets**—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., \$2.25 Parkersburg.  
**Galvanized Sheets**—Andrews Steel Co., \$3.75 basing pts.; Parkersburg Iron & Steel Co. \$3.85 Parkersburg; Apollo Steel Co. \$3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind. product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.  
**Pipe and Tubing**—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.  
**Black Sheets**—Empire Sheet and Tinplate Co., maximum base price mill is \$2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

# PRICES

## WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 9617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 9617-20	Cold Drawn, NE 9442-45 Ann.
Philadelphia	3.518	4.872*	5.018a	3.922	4.772	3.605	3.666	3.822	4.072	5.966	7.066	7.272	8.322
New York	3.590	4.613*	5.010	3.974*	4.772	3.768	3.758	3.855	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744*	5.224*	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.594	4.852	4.894	3.902	4.782	3.594	3.759	3.802	4.052				
Norfolk	3.771	4.955	5.371	4.165	4.865	3.971	4.002	4.065	4.165				
Chicago	3.25	4.20	5.231	3.60	4.651*	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337*	5.272*	3.737	4.7871*	3.667	3.667	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.674*	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.754*	3.619	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.004*	3.70	4.6591*	3.809	3.661	3.45	3.80	6.06	7.16	7.159	8.209
Cincinnati	3.425	4.475*	4.825*	3.675	4.711	3.811	3.691	3.611	4.011				
St. Louis	3.397	4.347*	5.172*	3.747	4.9311*	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.61	4.48	5.257*	3.86	4.351*	3.811*	3.811*	3.761*	4.361	6.09	7.19	7.561	8.711
Omaha	3.965	5.443	5.608*	4.215	4.165	4.165	4.115	4.43	4.43				
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.70	3.63	3.58	3.98	6.08	7.18	7.18	8.23
Birmingham	3.45		4.75	3.70		3.55	3.55	3.50	4.43				
Memphis	3.965*	4.66	3.285	4.215		4.065	4.065	4.065	4.33				
New Orleans	4.058*	4.95	5.358	4.308		4.158	4.158*	4.108*	4.629				
Houston	3.763	5.573	6.3131	4.313		4.25	4.25	3.75	6.373*	7.223	8.323	8.323	9.373
Los Angeles	5.50	7.20*	6.104	4.95	5.6131*	4.95	4.95	4.40	5.583	6.304	9.404	9.404	10.454
San Francisco	4.551*	7.304	6.354	4.5014	7.3331*	4.6514	4.6514	4.1514	5.333	6.304	9.404	9.404	10.454
Seattle	4.651*	7.054	5.954	4.2512		4.7512	4.4512	4.3512	5.763*				
Portland	4.651*	6.604	5.754	4.7511		4.7511	4.4511	4.4511	5.533*	6.304	9.404	9.404	10.454
Salt Lake City	4.531*		6.171*	5.531*		4.981*	4.981*	4.881*	5.90				

## MILL EXTRAS FOR NATIONAL EMERGENCY STEELS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 1330	0.10¢	\$2.00	.....	.....	NE 9415	0.75¢	\$15.00	\$1.25	\$25.00
NE 1335	0.10	2.00	.....	.....	NE 9417	0.75	15.00	1.25	25.00
NE 1340	0.10	2.00	.....	.....	NE 9420	0.75	15.00	1.25	25.00
NE 1345	0.10	2.00	.....	.....	NE 9422	0.75	15.00	1.25	25.00
NE 1350	0.10	2.00	.....	.....	NE 9425	0.75	15.00	1.25	25.00
NE 8612	0.65¢	\$13.00	\$1.15	\$23.00	NE 9427	0.75	15.00	1.25	25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00	NE 9722	0.65¢	\$13.00	\$1.15	\$23.00
NE 8640	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8642	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70¢	\$14.00	\$1.20	\$24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9753	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9756	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00	NE 9758	0.65	13.00	1.15	23.00
NE 8725	0.70	14.00	1.20	24.00	NE 9830	\$1.30	\$26.00	\$1.80	\$36.00
NE 8727	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9912	\$1.20	\$24.00	\$1.55	\$31.00
NE 8750	0.70	14.00	1.20	24.00	NE 9915	1.20	24.00	1.55	31.00
NE 9255	0.40¢	\$8.00	.....	.....	NE 9917	1.20	24.00	1.55	31.00
NE 9260	0.40	8.00	.....	.....	NE 9920	1.20	24.00	1.55	31.00
NE 9261	0.65	13.00	.....	.....	NE 9922	1.20	24.00	1.55	31.00
NE 9262	0.65	13.00	.....	.....	NE 9925	1.20	24.00	1.55	31.00
					NE 52100A	.....	.....	\$2.60	\$52.00
					NE 52100B	.....	.....	2.60	52.00
					NE 52100C	.....	.....	2.60	52.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip, and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

## BASE QUANTITIES

Standard unless otherwise keyed on prices.

**HOT ROLLED:** Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

**COLD ROLLED:** Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

**EXCEPTIONS:** (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over. (19) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

\*Add 0.271c. for sizes not rolled in Birmingham.

\*\*City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports\*)

Per Gross Ton  
Old range, bessemer, 51.50 ..... \$4.75  
Old range, non-bessemer, 51.50 ..... 4.60  
Mesaba, bessemer, 51.50 ..... 4.60  
Mesaba, non-bessemer, 51.50 ..... 4.45  
High phosphorus, 51.50 ..... 4.35  
\*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

## FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

## Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Base price per short ton  
Effective CaF<sub>2</sub> Content:  
70% or more ..... \$33.00  
65% but less than 70% ..... 32.00  
60% but less than 65% ..... 31.00  
Less than 60% ..... 30.00



## PRICES

### SEMI-FINISHED STEEL

#### Ingots, Carbon, Rolling

Base per gross ton, f.o.b. mill... \$31.00  
 Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., \$34.25. Pgh. Steel Co. \$33.10.

#### Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown... \$36.00  
 Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports. Pgh. Steel Co. \$38.10.

#### Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh... \$45.00  
 Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

#### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

#### Per Gross Ton

Rerolling... \$34.00  
 Forging quality... 40.00  
 For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

#### Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton... 54.00  
 Price delivered Detroit \$2.00 higher; E. Michigan \$3.00 higher.

#### Shell Steel

#### Per Gross Ton

3 in. to 12 in.... \$52.00  
 12 in. to 18 in.... 54.00  
 18 in. and over... 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

#### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

#### Per Gross Ton

Open hearth or bessemer... \$34.00

#### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

#### Per Lb.

Grooved, universal and sheared... 1.90c.

#### Wire Rods

(No. 5 to 9/32 in.)

#### Per Lb.

Pittsburgh, Chicago, Cleveland... 2.00c.  
 Worcester, Mass... 2.10c.  
 Birmingham... 2.00c.  
 San Francisco... 2.50c.  
 Galveston... 2.25c.  
 9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

### TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

#### Base per lb.

High speed... 67c.  
 Straight molybdenum... 54c.  
 Tungsten-molybdenum... 57 1/2c.  
 High-carbon-chromium... 43c.  
 Oil hardening... 24c.  
 Special carbon... 22c.  
 Extra carbon... 18c.  
 Regular carbon... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

## UNSEEN BUT

## MIGHTY IMPORTANT!

Perhaps BEARING BALLS should cry-out "We carry the load"—"We are the basic working part of the bearing"—"Why don't WE get 'a pat on the back?'"

Yet, how often do BEARING BALLS get the credit? They're the unseen burden bearers, doing their job day after day under gruelling strains, enduring brutal shocks. Mighty important jobs, these—and done without fanfare when ABBOTT BEARING BALLS are in your assemblies.

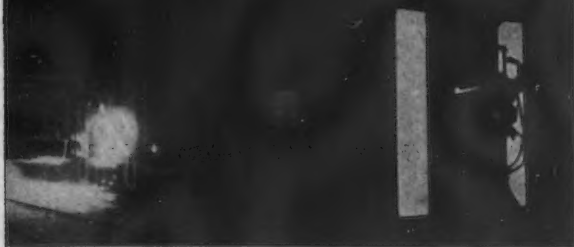
Recognize the importance of these "unseen" units in **your** products and specify "ABBOTT" for uninterrupted, carefree performance. "Let ABBOTT carry the load as planned."

ABBOTT'S  35th YEAR



**ABBOTT** *Bearing* **BALLS**  
 THE ABBOTT BALL COMPANY HARTFORD 10, CONN. U.S.A.

# Heat You Can Feel outside your open hearth WON'T MAKE STEEL inside -



## Did you Know?

Over 50% of furnace wall radiation losses alone can be stopped? Therm-O-Flake insulation is preferred for this work in most steel plants.

## Here's why!

Highest insulating value — easy to apply — low maintenance — low cost — high reclamation — sticks tightly to silica or basic brick — permits closer control of fuel-air ratios — reduces cold air infiltration.

## Write for literature



# Therm-O-Flake

HIGH TEMPERATURE INSULATION

BRICK - BLOCK - COATINGS - CONCRETE - GRANULES

## HOW TO HANDLE STEEL

# Faster



Move a KRANE KAR up to a pile of forgings, bars, blooms, billets, ingots, castings (or a scrap heap when equipped with an electric magnet), and top the boom with the full load. Transport load forward or backward and position it on either side in places inaccessible to a rigid boom crane. Make speed with the all-around safety features—stability without outriggers or jacks, automatic braking of load and boom, easy steering, and utter simplicity of operation. KRANE KAR is so easy to handle, women become expert operators in a week! Write for catalog.

USERS: Carnegie-Illinois; Bethlehem; Republic; General Motors; Consolidated; American Smelting & Refining; Lima Locomotive Wks.; etc.



THE ORIGINAL SWING BOOM MOBILE CRANE  
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

# KRANE KAR

SILENT HOIST & CRANE CO., 851 63RD ST., BROOKLYN 20, N.Y.

## PRICES

### WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills  
(F.o.b. Pittsburgh only on wrought pipe)  
Base Price—\$100.00 per Net Ton

#### Steel (Butt Weld)

	Black	Galv.
½ in. ....	63½	51
¾ in. ....	66½	56
1 to 3 in. ....	68½	57½

#### Wrought Iron (Butt Weld)

½ in. ....	24	2½
¾ in. ....	30	10
1 and 1½ in. ....	34	16
1½ in. ....	38	18½
2 in. ....	37½	18

#### Steel (Lap Weld)

2 in. ....	61	49½
2½ and 3 in. ....	64	52½
3½ to 6 in. ....	66	54½

#### Wrought Iron (Lap Weld)

2 in. ....	30½	12
2½ to 3½ in. ....	31½	14½
4 in. ....	33½	18
4½ to 8 in. ....	32½	17

#### Steel (Butt, extra strong, plain ends)

½ in. ....	61½	50½
¾ in. ....	65½	54½
1 to 3 in. ....	67	57

#### Wrought Iron (Same as Above)

½ in. ....	25	6
¾ in. ....	31	12
1 to 2 in. ....	38	19½

#### Steel (Lap, extra strong, plain ends)

2 in. ....	59	49½
2½ and 3 in. ....	63	52½
3½ to 6 in. ....	66½	56

#### Wrought Iron (Same as Above)

2 in. ....	33½	15½
2½ to 4 in. ....	39	22½
4½ to 6 in. ....	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30%, and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

### CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago....	\$54.00
6-in. and larger, del'd New York....	52.00
6-in. and larger, Birmingham ....	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles ....	69.40
6-in. and larger f.o.b. cars, Seattle. 71.20	
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

### BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld
	Cold	Hot
	Drawn	Hot Rolled
2 in. o.d. 13 B.W.G. 15.03	15.03	13.04
2½ in. o.d. 12 B.W.G. 20.21	20.21	17.54
3 in. o.d. 12 B.W.G. 22.48	22.48	19.50
3½ in. o.d. 11 B.W.G. 28.37	28.37	23.10
4 in. o.d. 10 B.W.G. 35.20	35.20	30.54
(Extras for less carload quantities)		
40,000 lb. or ft. and over.....	Base	
30,000 lb. or ft. to 39,999 lb. or ft. 5%		
20,000 lb. or ft. to 29,999 lb. or ft. 10%		
10,000 lb. or ft. to 19,999 lb. or ft. 20%		
5,000 lb. or ft. to 9,999 lb. or ft. 30%		
2,000 lb. or ft. to 4,999 lb. or ft. 45%		
Under 2,000 lb. or ft. ....	65%	



## PRICES

### WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points	Coast Basing Points
	Named	Points
	Base per Keg	
Standard wire nails.....	\$2.55	\$3.05
Coated nails .....	2.55	3.05
Cut nails, carloads .....	3.85	....
	Base per 100 Lb.	
Annealed fence wire ....	\$3.05	\$3.55
Annealed galy. fence wire	3.40	3.90
	Base Column	
Woven wire fence* ....	\$0.67	\$0.85
Fence posts, carloads ...	.69	.86
Single loop bale ties ...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire ..	.70	....

\*15 1/2 gage and heavier. \*\*On 80-rod spools in carload quantities.  
†Prices subject to switching or transportation charges.

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

#### Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
1/4 in. & smaller x 6 in. & shorter...	65 1/2
9/16 & 5/8 in. x 6 in. & shorter...	63 1/2
3/4 to 1 in. x 6 in. & shorter .....	61
1 1/4 in. and larger, all lengths .....	59
All diameters over 6 in. long.....	59
Lag, all sizes .....	62
Plow bolts .....	65

#### Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

1/4 in. and smaller .....	62
9/16 to 1 in. inclusive.....	59
1 1/4 to 1 1/2 in. inclusive.....	57
1 1/2 in. and larger .....	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

#### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller .....	64
1/2 in. and smaller .....	62
3/4 in. through 1 in. ....	60
9/16 in. to 1 in. ....	59
1 1/4 in. through 1 1/2 in. ....	57
1 1/2 in. and larger .....	56

In full keg lots, 10 per cent additional discount.

#### Stove Bolts

Consumer

Packages, nuts loose .....	71 and 10
In packages, with nuts attached .....	71
In bulk .....	80

On stove bolts freight allowed up to 65c per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

#### Large Rivets

(1/2 in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....	\$3.75
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#### Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....	65 and 5
---	----------

#### Cap and Set Screws

Consumer

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. ....	64
Upset set screws, cup and oval points	71
Milled studs .....	46
Flat head cap screws, listed sizes....	36
Phillister head cap, listed sizes .....	51

Freight allowed up to 65c per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C. ....	\$6.00	\$12.00
15-lb. coating I.C. ....	7.00	14.00
30-lb. coating I.C. ....	7.50	15.00

# Assuring UNIFORM RESULTS IN HEAT TREAT PRODUCTION



● The NIAGARA Aero HEAT EXCHANGER constantly maintains correct quench temperature, cooling or heating, as determined by the rate of heat input or load fluctuations. This is accomplished by the Niagara patented "Balanced Wet Bulb" control which automatically uses the correct mixture of fresh outdoor air with air recirculated.

The NIAGARA Aero HEAT EXCHANGER employs the evaporative principle of cooling, eliminating costly water bills and protecting the user from the risk of interrupted water supply. Its direct savings quickly repay for its installation. Write for Bulletins 90 and 96.

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Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

# NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

# PRICES

## PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00		
Brooklyn	27.50	27.00		28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia (4)	25.86	25.36	26.86	26.36	\$30.74	
Bethlehem, Pa.	25.00	24.50	26.00	25.50		
Everett, Mass.	25.00	24.50	26.00	25.50		
Swadeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.	25.00	24.50	26.00	25.50	29.80	
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.80	
Sparrows Point, Md.	25.00	24.50	26.00	25.50		
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	25.00	24.50		
Sharpsville, Pa. (1)	24.00	23.50	25.00	24.50		
Buffalo	24.00	23.00	25.00	24.50	29.80	
Cincinnati, Ohio	25.11	24.61		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.66	
St. Louis	24.50	24.50				
Chicago	24.00	23.50	24.50	24.00	35.46	\$37.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00	32.63	
Hamilton, Ohio	24.00	23.50	24.50	24.00		
Toledo	24.00	23.50	24.50	24.00	32.63	
Youngstown	24.00	23.50	24.50	24.00		
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.						34.00
Lykes, Tenn. fc. (2)						33.00
St. Paul	26.63	26.13	27.13	26.63	39.80	
Duluth	24.50	24.00	25.00	24.50		
Birmingham	20.38	19.00	20.00			
Los Angeles	26.95					
San Francisco	26.95					
Seattle	26.95					
Provo, Utah	22.00	21.80				
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace .....\$33.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for \$28.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa., permitted to charge \$1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh .....21 1/4 to 23 1/4c

Copper, reduced, 150 and 200 mesh .....20 1/4 to 25 1/4c

Iron, commercial, 100 and 200 mesh, 96 + % Fe .....13 1/2 to 15c

Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots .....4c

Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots .....63c

Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe.30 to 33c

Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe .....42c

Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe .....90c

Aluminum, 100 and 200 mesh, \*23 to 27c

Antimony, 100 mesh .....20.6c

Cadmium, 100 mesh .....\$1

Chromium, 150 mesh .....\$1.03

Lead, 100, 200 & 300 mesh, 11 1/2 to 12 1/4c

Manganese, 150 mesh .....51c

Nickel, 150 mesh .....51 1/2c

Solder powder, 100 mesh, 8 1/2c. plus metal Tin, 100 mesh .....58 1/2c

Tungsten metal powder, 98%-99%, any quantity, per lb. ....\$2.60

Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. \$2.60

Under 100 lb. ....\$3.00

\*Freight allowed east of Mississippi.

## COKE

Furnace, beehive (f.o.b. oven) Net Ton

Connellsville, Pa. ....\$7.00\*

Foundry, beehive (f.o.b. oven)

Fayette Co., W. Va. ....8.10

Connellsville, Pa. ....8.28

Foundry, By-Product

Chicago, del'd .....13.38

Chicago, f.o.b. ....12.60

New England, del'd .....14.25

Kearny, N. J., f.o.b. ....12.65

Philadelphia, del'd .....12.88

Buffalo, del'd .....13.00

Portsmouth, Ohio, f.o.b. ....11.10

Painesville, Ohio, f.o.b. ....11.78

Erie, del'd .....12.75

Cleveland, del'd .....12.80

Cincinnati, del'd .....12.86

St. Louis, del'd .....13.88

Birmingham, del'd .....10.50

\*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges. \*\*Mo., Ala., and Tenn. producers—\$13.38.

# MARK STEEL PLATES

this Positive, Easy Way

Write with Paint

**MARKAL DRIES HARD AND FAST**

MARKAL PAINTSTIKS are ideal for layout work on bare or coated metal plates by shipyards, steel mills, steel fabricators, railroads, foundries, etc.

MARKAL PAINTSTIK marks dry instantaneously, permitting immediate handling of plates. Workers can walk on plates without effacing marks.

MARKS COME OFF IN PICKLING BATH OR WITH SOLVENTS

**QUICK AND CLEAN—NO MESS, NO FUSS—ALWAYS READY FOR INSTANT USE**

**MARKAL PAINTSTIK**  
REAL PAINT IN STICK FORM—HANDY AS A PENCIL

A Specific Type  
MARKAL PAINTSTIK  
for Every Marking Job

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**MARKAL CO.** 629 N. Western Ave.  
Chicago 12, Ill.  
"Originators of Paint Sticks"



## PRICES

### REFRACTORIES

(F.o.b. Works)

Fire Clay Brick		Per 1000
Super-duty brick, St. Louis	.....	\$64.60
First quality, Pa., Md., Ky., Mo., Ill.	.....	51.30
First quality, New Jersey	.....	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	.....	46.55
Second quality, New Jersey	.....	51.00
No. 1, Ohio	.....	43.00
Ground fire clay, net ton	.....	7.60

Silica Brick		
Pennsylvania and Birmingham	.....	\$51.30
Chicago District	.....	58.90
Silica cement, net ton (Eastern)	.....	9.00

Chrome Brick		Per Net Ton
Standard chemically bonded, Balt.,	.....	
Plymouth Meeting, Chester	.....	\$54.00

Magnesite Brick		
Standard, Balt. and Chester	.....	\$76.00
Chemically bonded, Baltimore	.....	65.00

Grain Magnesite		
Domestic, f.o.b. Balt. and Chester	.....	
In sacks (carloads)	.....	\$43.48
Domestic, f.o.b. Chewelah, Wash.	.....	
(In bulk)	.....	22.00

### RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.,	
No. 1 O.H., gross ton	.....\$40.00
Angle splice bars, 100 lb.	.....2.70
(F.o.b. Basing Points)	Per Gross Ton
Light rails (from billets)	.....\$40.00
Light rails (from rail steel)	.....39.00
Base per Lb.	
Cut spikes	.....3.00c.
Screw spikes	.....5.15c.
Tie plates, steel	.....2.15c.
Tie plates, Pacific Coast	.....2.30c.
Track bolts	.....4.75c.
Track bolts, heat treated, to rail-	.....
roads	.....5.00c.
Track bolts, jobbers discount	.....63-5
Basing points, light rails, Pittsburgh,	.....
Chicago, Birmingham; cut spikes and tie	.....
plates—Pittsburgh, Chicago, Portsmouth,	.....
Ohio, Weirton, W. Va., St. Louis, Kansas	.....
City, Minnequa, Colo., Birmingham and	.....
Pacific Coast ports; tie plates alone—	.....
Steelton, Pa., Buffalo, Cut spikes alone—	.....
Youngstown, Lebanon, Pa., Richmond,	.....
Oregon and Washington ports, add 25c.	.....

### CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

#### Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	.....21.25c.	20.40c.
Bars	.....25.00c.	24.00c.
Plates	.....29.00c.	27.00c.
Structural shapes	.....25.00c.	24.00c.
Sheets	.....36.00c.	34.00c.
Hot rolled strip	.....23.50c.	21.50c.
Cold rolled strip	.....30.00c.	28.00c.
Drawn wire	.....25.00c.	24.00c.

#### Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

#### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	.....18.00c.*
Sheets	.....19.00c.

\*Includes annealing and pickling.

### ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	.....3.20c.
Armature	.....3.55c.
Electrical	.....4.05c.
Motor	.....4.95c.
Dynamo	.....5.65c.
Transformer 72	.....6.15c.
Transformer 65	.....7.15c.
Transformer 58	.....7.65c.
Transformer 52	.....8.45c.
F.o.b. Granite City, add 10c. per 100	.....
lb. on field grade to and including	.....
dynamo. Pacific ports add 75c. per 100	.....
lb. on all grades.	.....

## For Purchasing Agents, Buyers, Foremen, Superintendents

### A BOOK CONTAINING THE FOLLOWING TABLES:

(Size 5½ x 8½)

Mensuration, Trigonometric Functions, Areas, Volumes, Lengths of Arcs, Weights of Materials, Standard Gauges of Sheets, Plates and Wires, Weights and Areas of Square and Round Bars, Weights of High Speed Steels, Gauge Thicknesses, Expansion by Heat, Electroplating Information, Color Codes for Steel, Machineability Ratings, Hardness Conversion Charts, Cutting Speeds, etc.

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27 NORTH 4TH STREET, MINNEAPOLIS 1, MINN.

P. O. BOX 1124



HEAT-TREATED STEEL SHOT

We manufacture  
shot and grit for  
endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

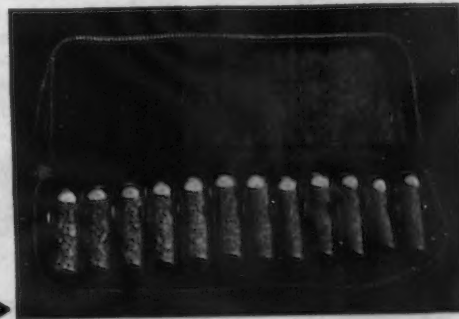
Heat-Treated Steel Shot and  
Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

## HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT



# ETNA

A client of ours had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so they did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from  $\frac{3}{8}$ " to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING...

Ask **ETNA**  
About Swaging



**ETNA**  
MACHINE COMPANY  
TOLEDO OHIO



**3000 lb. Electro Processing Oven**  
of  $\frac{1}{4}$ " steel plate  
(50" long x 36" inside diameter)  
shown with rock wool jacket removed... fabricated by Brandt for a large cork board plant.

Forming,  
Welding,  
Fabricating—

Call **BRANDT of Baltimore**

for Precision in Heavy Plate and Sheet Steel Work

Here is an 8½ acre plant... with the most modern equipment for shearing, rolling, forming, welding and completely fabricating ferrous, non-ferrous and alloy metals to your specifications... from the lightest gauge up to and including 1½" mild steel or ¾" armor plate. Extensive war contracts necessarily limit our present acceptance of new business for immediate delivery. For information, address: Charles T. Brandt, Inc., Baltimore-30, Maryland.



BRANDT of Baltimore—Craftsmen in Metal Since 1890

## PRICES

### Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.  
Carload lots (bulk) ..... \$135.00  
Carload lots (packed) ..... 141.00  
Less ton lots (packed) ..... 148.50  
Premium, \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

### Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.  
96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.  
Carload, bulk ..... 36c.  
L.c.l. lots ..... 38c.  
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.  
Carload, bulk ..... 34c.  
L.c.l. lots ..... 35c.

### Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.  
16-19% Mn 19-21% Mn  
3% max. Si 3% max. Si  
Carloads ..... \$35.00 \$36.00  
Less ton ..... 47.50 48.50

### Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si ....	6.65c.	7.10c.	7.25c.
75% Si ....	8.05c.	8.20c.	8.75c.
80-90% Si ..	8.90c.	9.05c.	9.55c.
90-95% Si ..	11.05c.	11.20c.	11.65c.
Spot sales add: .45c. per lb. for 50% Si, .3c. per lb. or 75% Si, .25c. per lb. for 80-90% and 90-95% Si.			

### Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 \$t)  
F.o.b. Jackson, Ohio ..... \$29.50  
Buffalo ..... 30.75  
For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorous or over.  
\*OPA price established 6-24-41.

### Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

### Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe. 13.10c.	13.55c.	16.50c.	
97% Si, 1% Fe. 13.45c.	13.90c.	16.80c.	

### Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk 3.35c.	3.50c.	3.65c.	
2000 lb.-carload ..... 3.8c.	4.2c.	4.25c.	

### Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk ..... 6.05c.			
2000 lb. to carload ..... 6.70c.			
Under 2000 lb. .... 6.90c.			
Briquets, contract, basis carlots, bulk freight allowed, per lb.... 5.80c.			
2000 lb. to carload ..... 6.30c.			
Less ton lots ..... 6.55c.			

### Ferrochrome

(65-72% Cr, 2% max. Si)  
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

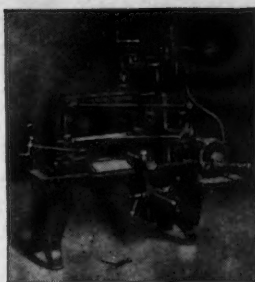
	Eastern Zone	Central Zone	Western Zone
0.06% C ..... 23.00c.	23.40c.	24.00c.	
0.10% C ..... 22.50c.	22.90c.	23.50c.	
0.15% C ..... 22.00c.	22.40c.	23.00c.	
0.20% C ..... 21.50c.	21.90c.	22.50c.	
0.50% C ..... 21.00c.	21.40c.	22.00c.	
1.00% C ..... 20.50c.	20.90c.	21.50c.	
2.00% C ..... 19.50c.	19.90c.	21.00c.	
66-71% Cr, 4-10% C ... 13.00c.	13.40c.	14.00c.	



## PRICES

### Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/4" down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more...	\$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open Hearth	\$2.70
Crucible	\$2.80
Primus	\$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	\$1.50
Vanadium pentoxide, 88%-92% V <sub>2</sub> O <sub>5</sub> technical grade, contract basis, any quantity, per lb. contained V <sub>2</sub> O <sub>5</sub> . Spot sales add 5c. per lb. contained V <sub>2</sub> O <sub>5</sub>	\$1.10
Ferroboration, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.	
2000 lb. to carload	\$1.20
Under 2000 lb.	1.30
Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Hortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	\$2.25
Under 2000 lb. lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti.	\$1.23
Less ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload	\$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	4.6c.
Carload, bulk	
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.75c.
Ton lots	9.25c.



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**FOR LIGHT DUTY**  
**Speed!**

**High Speed at Low Cost**  
**No. 4B**

For tool room, stock room, or maintenance shop, this 6' x 6' capacity hack saw is superior to anything in its price class. Embodies similar features of MARVEL Heavy Duty production saws. Cuts a 2" standard pipe in 30 seconds—a 5" round piece of machine steel in 8 minutes!

**MARVELSAWS**

**2-Speed and 4-Speed**

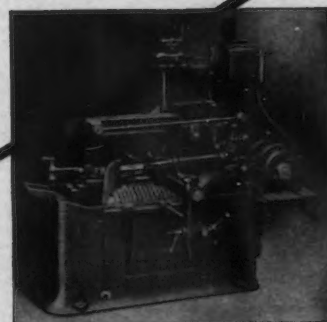
For applications where materials of different hardnesses are cut, MARVEL 4B is available in 2-Speed and 4-Speed models. Built-in work trucks for holding outer end of bars are also available for all models.

### Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course.)

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**INDUSTRIAL PERFORATIONS.** include round, square and special shaped perforations as used in mechanical arts. Our line is comprehensive.

**ORNAMENTAL PERFORATIONS** as used in architectural grilles, metal furniture, enclosures, cabinets, stoves and for ornamentation. Many attractive and exclusive patterns.

H & K workmanship is unsurpassed.

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